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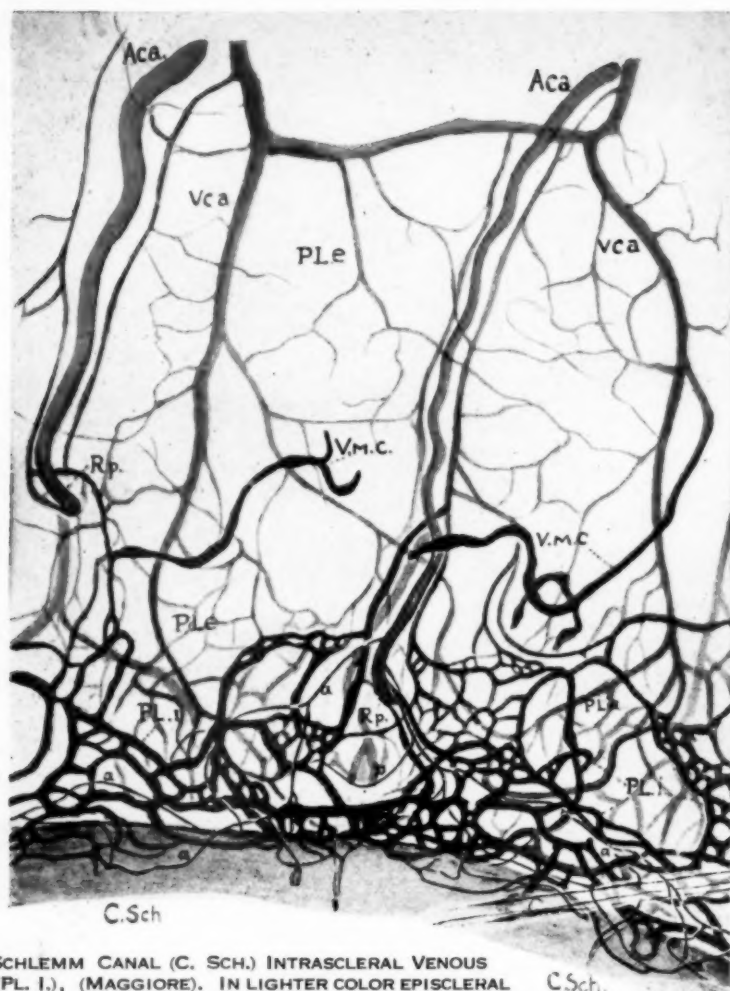


FIG. 1. SCHLEMM CANAL (C. SCH.) INTRASCLERAL VENOUS PLEXUS (PL. I.), (MAGGIORE). IN LIGHTER COLOR EPISCLERAL VENOUS PLEXUS (PL. E.). C COLLECTORS JOINING CANAL WITH PLEXUS. A. ARTERIES OF PLEXUS. A.C.A. ANTERIOR CILIARY ARTERY. V.C.A. ANTERIOR CILIARY VEIN. V.M.C. VEINS OF THE CILIARY MUSCLE.

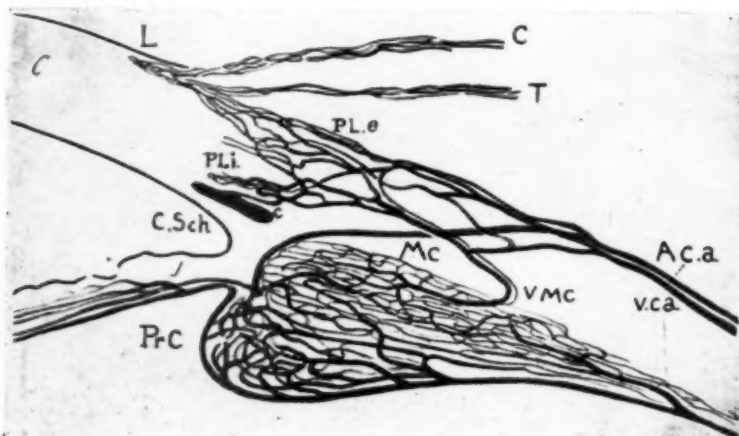


FIG. 2. DIAGRAM FROM MICROSCOPIC SERIAL SECTIONS ADULT HUMAN EYE. SHOWS RELATIONS OF PLEXES: C, CONJUNCTIVAL; T, OF TENON CAPSULE; PL.E. EPISCLERAL AND PL.I. INTRASCLERAL. C, CORNEA. L, LIMBUS. C.SCH. SCHLEMM CANAL. C, COLLECTOR. A.C.A. ANTERIOR CILIARY ARTERY AND VEIN. V.M.C. VEIN FROM THE CILIARY BODY. MC. CILIARY MUSCLE. PR.C. CILIARY PROCESSES. (MAGGIORE.)

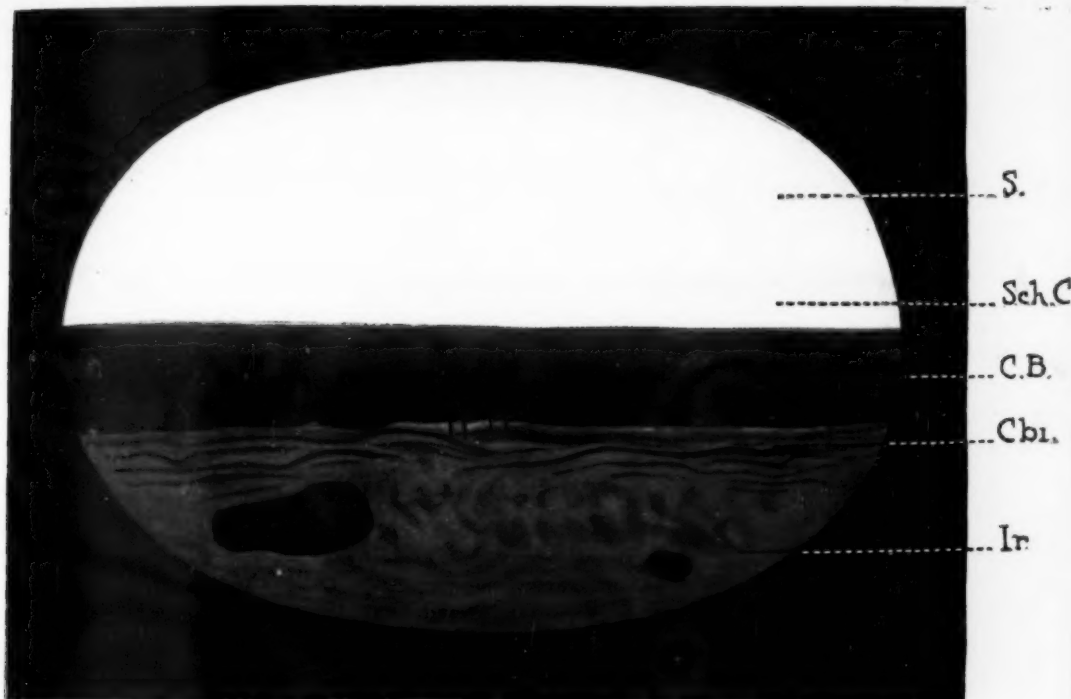


FIG. 5. ANGLE OF THE ANTERIOR CHAMBER IN KERATOGLUBUS, BY DIRECT OPHTHALMOSCOPIC EXAMINATION. IR, IRIS; CBI, CILIARY BORDER OF THE IRIS, C.B., CILIARY BODY, SCH.C., SCLERO-CORNEAL TRABECULUM BEHIND WHICH LIES SCHLEMM CANAL. S., INNER SURFACE OF SCLERA, URIBE TRONCOSO.

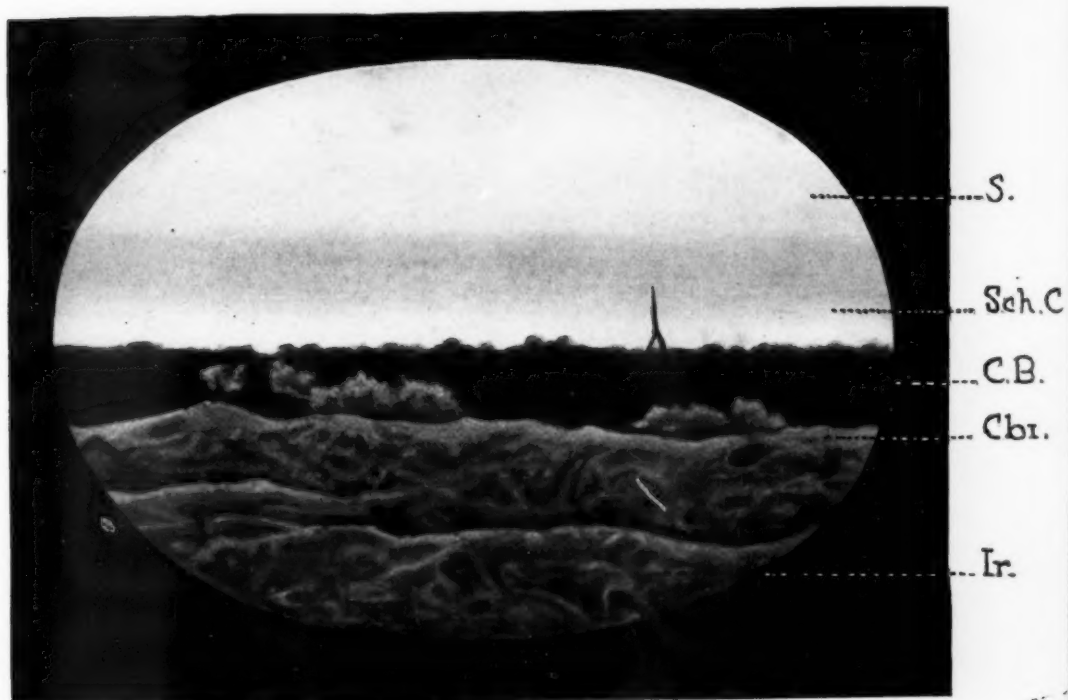


FIG. 6. ANGLE OF THE ANTERIOR CHAMBER (SALZMANN). CASE OF TUBERCULOUS IRITIS WITH THE SCHLEMM CANAL FILLED WITH DILUTED BLOOD. LETTERS HAVE SAME MEANING AS IN FIG. 5.

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THE PHYSIOLOGIC NATURE OF THE SCHLEMM CANAL.

M. URIBE-TRONCOSO, M.D.

NEW YORK.

This paper reviews the various investigations regarding the function of Schlemm's canal, and summarizes the proof that it is normally a lymph space, rarely containing any blood.

There is a small region in the eye, which has attracted the attention of ophthalmologists since the middle of the last century, being the prolific source of many interesting researches and still more divergent opinions. This region is the angle of the anterior chamber, with its two important structures: the pectinate ligament, and the Schlemm canal.

Concealed in the living eye by the opaque edge of the sclera, the sclero-corneal angle was, until very recently, out of reach by our instruments and the different methods of examination. Its principal organ, the Schlemm canal, altho perfectly described from the anatomic standpoint, was falsely construed from the physiologic; and its exact nature asserted only by suppositions, or by imperfectly drawn conclusions from animal experimentation.

The prevalent view in ophthalmology today is to consider the Schlemm canal a venous sinus. Such opinion was set forth and strongly supported by Leber,¹ since 1873 as a result of his experimental work and his studies in comparative anatomy of the angle in animals and men. Leber described the Schlemm canal as a closed venous plexus, entirely similar in character to the sinuses of the dura mater.

However, a former opinion sustained by Schwalbe² as far back as 1869, considered the canal as a lymphatic vessel. He reached this conclusion in the course of his researches on the ocular lymphatics, by using injections of Berlin blue in the anterior chamber.

The colored matter not only filled the meshes of the pectinate ligament, but also penetrated into the Schlemm canal, and thence into the scleral venous branches, escaping out of the eye by the anterior ciliary veins. Schwalbe concluded that a free communication existed between the anterior chamber and the canal, whose inner wall was provided with stomata or apertures.

With this idea Leber strongly disagreed, and with new researches was able to demonstrate that nondiffusible coloring matters penetrated into the Schlemm canal, not by preexisting openings, but thru tearings in the inner wall made by the pressure of the injection; this wall being a continuous osmotic membrane thru which only diffusible substances could pass.

A protracted and confusing controversy followed, many observers taking sides with Schwalbe and others with Leber. At last Schwalbe himself, Waldeyer and Gutmann relinquished their former views, and accepted the venous nature of the sinus.³

Strange to say, strong arguments such as the anatomic structure of the canal, and the almost total absence of red blood corpuscles in its lumen, as observed in microscopic sections of dead eyes were disposed of, and explained in different ways.

The idea of the venous nature of the Schlemm canal was almost universally accepted in science, when in 1909, as a result of physiologic investigations conducted on the filtration of the fluids of the eye thru the angle, the author arrived at the conclusion⁴ that

its contents were entirely of lymphatic origin, the lumen being filled, under physiologic conditions, by the aqueous, and only entered by blood coming from the anterior ciliary veins, when the general blood pressure was increased to such an extent, that the normal barriers were overcome. In a second paper,⁵ published in 1914, the same idea was supported by new experimental facts and physiologic considerations.

Some brief explanations of the anatomic relationship between the canal and the venous network inside of the sclera, and in the episclera, around the limbus, are necessary, in order to convey an accurate idea of the basis and significance of my experiments.

In this description I will emphasize some new points recently brought out by Dr. L. Maggiore, of Rome, in his important monograph on the Schlemm canal, which has settled some doubtful or imperfectly known facts.⁶

The Schlemm canal is a plexiform organ, differing from veins by the complete absence of a proper wall; the canal and the tubes starting from it being formed only by an endothelial layer enclosed between the scleral fibres. It is annexed, according to Maggoire, to a large closed vascular plexus (Fig. 1), running inside of the limbus and formed almost entirely by venous branches, altho there are some fine arteries and capillaries. See Color Plate VI.

This intrascleral venous plexus ends in a few larger branches, which perforate the sclera near the margin of the cornea, and empty into the episcleral plexus. On the other hand the anterior ciliary veins perforate the sclera further back and empty into the same episcleral network, but previously receiving a few branches from the intrascleral, pericorneal plexus (Fig. 2, Color Plate VI).

The intrascleral plexus was first described by Maggiore, the old conception being of almost straight venous branches crossing the sclera and connecting with the canal by small fine recurrent branches. The same author lays stress especially on the relations

of the small trunks joining the canal itself with the venous plexus. These he calls "collectors," and describes them as being of a conical shape arising by a large base from the anterior surface or convex margin of the canal, generally in a slanting way, each to run a short course and end by its apex in the intrascleral plexus, with which they join also in an oblique manner, sometimes even forming small hooks. These collectors, scarce in number,—about 20 in all,—are merely fissures between the scleral fibres, with a virtual lumen, and could be seen only with high magnifications, or in cases in which there are present inside some red blood corpuscles.

I have alluded in my former papers to the very small size of these "collectors," whose caliber, according to Schwalbe, is only 0.024 mm., showing the great difficulty the blood from the veins must experience in penetrating the canal. In fact they act as valves, preventing the blood from coming into the canal when the general blood pressure is normal.

I wish to emphasize the fact, also set forth by Thomson Henderson, that all the perforating venous branches, especially those around the cornea which belong to the intrascleral network, are in communication with the Schlemm canal, either directly or indirectly, a fact of great physiologic significance.

As may be concluded from its anatomic characteristics and vascular connections, the Schlemm canal is a well differentiated organ in man, while in animals its position, shape, relations, and number of vascular channels varies greatly.

The monkey's angle is the most similar to man. In the rabbit, which is the animal almost always used in experimental work, it differs principally by the great importance of the Fontana spaces, whose cavities are very wide and form a true large lymphatic canal, situated in the angle between the sclero-cornea and the ciliary body, and separated in part from the anterior chamber by the suspensory ligament of the lens. This canal, filled

with aqueous, takes, probably from a physiologic standpoint, the place of the Schlemm channel in men, and is in relation with the episcleral vascular network by many small vessels, some of which are placed between the scleral fibers in the normal place of the Schlemm canal in man, and afterward perforate the sclera near the limbus.

The meshes of the pectinate ligament play in regard to these vessels,

living rabbit, fastened to an anatomic board, the conjunctiva is cut around the cornea, exactly at its insertion to the limbus, and dissected as far back as the equator, just as it is done for enucleation, leaving the sclera well exposed. The globe is then secured with a forceps grasping the superior rectus and slowly drawn out of its socket, until the anterior segment is out of the orbit.

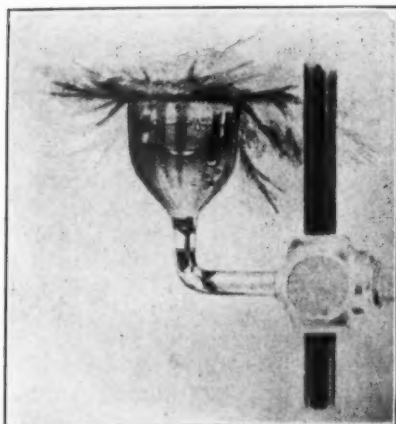


Fig. 3.—Filtration in a rabbit's eye isolated by an impermeable membrane and immersed in a glass cup filled with olive oil. Large blood clots with lymph at the lower ends can be seen on both sides of the limbus; also clear droplets and a large, clear drop coming from the other side of the limbus and staying in the apex of the cornea. In the lower part of the cup some blood and fluid have collected in the straight tube.

and those of the ciliary body, probably the same protective role which the sclero-corneal trabeculum plays in man, stopping all foreign matter, pigment granulations, corpuscles, exudates, etc., which may impair the osmotic filtration qualities of these vascular membranes.

In the course of a series of experiments primarily intended to demonstrate the continuous filtration of ocular fluids in the living eye, and determining its amount,⁴ I found that all these perforating vessels near the edge of the cornea conveyed a liquid so poor in red blood corpuscles, as to be readily considered as lymphatic channels.

The technic of these experiments is as follows: After cleansing and cocaineizing the conjunctival sac in a

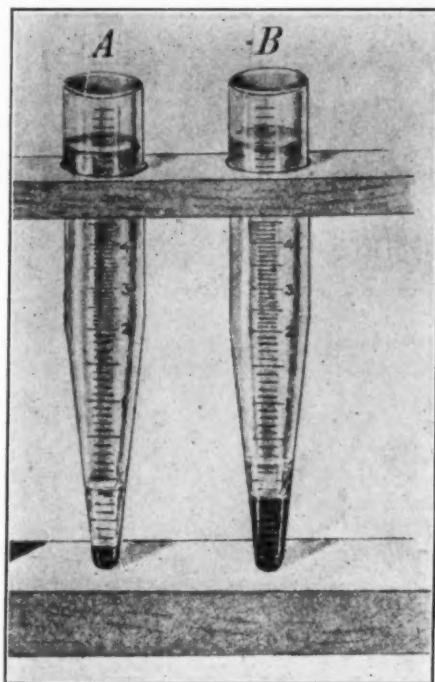


Fig. 4.—Comparative relation between the constituents of the filtrate from the eye A, and pure blood taken from the rabbit's ear, B; after centrifugation.

In order to hold it in this position, both lids are rolled inside between the globe and the orbit, and if necessary kept in position by a stitch made in the outer canthus. The animal is then turned on the side in a vertical position, in such a way that the apex of the cornea shall be the lowest point of the eye. The globe is then made to pass thru a hole in a piece of rubber-dam sheet, to avoid all liquids from the conjunctiva or orbit coming in contact with the eye; the sclera is mopped of all the blood and clots, and the globe

immersed until near the equator, into a glass cup filled with olive oil. (Fig. 3.)

In this way all the liquids coming from the sectioned perforating ciliary vessels, and from the veins of the intrascleral network around the limbus, fall in the oil, can be collected, exactly measured, and their true nature ascertained. From all the cut vascular tubes near the limbus leaks a clear, almost transparent liquid, which collects in droplets slightly colored by the blood. From the large trunks of the anterior ciliary vessels blood comes out at first, coagulates and gives way then to a clear lymph. After experiments lasting from a half to one hour, the centrifugated oil gives a small clot and a large quantity of a clear liquid, which can be compared (Fig. 4) with a similar amount of blood taken from the ear of the rabbit, and the exact proportions of the clot and serum in the filtrate calculated; the rest being pure lymph; that is aqueous humor.

Should the Schlemm canal be a venous sinus as Leber believed, only blood should be found in the filtrate, in the same way that if a faucet is opened or a pipe cut thru, the liquid which filled the latter, and no other, will come out. All the veins of the episcleral plexus being in communication with the Schlemm canal as pointed out, only blood should come out thru their cut ends. If, on the contrary, a clear transparent fluid flows out from these cut vessels, this fact authorizes us to consider the Schlemm canal as a lymphatic space.

This clear liquid comes out continually, and its rate can be calculated at an average of 3.5 c.mm. in a minute.

The term "filtration" was used by Leber, to indicate that the aqueous did not pass thru the inner wall into the lumen of the Schlemm canal by simple osmosis, but as a result of the greater pressure on one side of this membrane, produced by the intraocular tension.

Hamburger has brought forward recently some objections to my experiments, pointing out that the subluxation of the globe out of the socket changes the venous and capillary cir-

culatation. But even in this case, the result of the subluxation could only be a congestion of the eye that will draw more blood to the intrascleral plexus and will cause a greater output of blood into the oil, but never can produce the exit of a different kind of fluid as the lymph, around the limbus.

In order to meet some other criticisms of Weiss, I made a new series of experiments in 1914, studying for the sake of comparison, the lymphatic circulation of the testicle in its different layers, by the same method of immersion in oil. Its results were very interesting showing that the subcutaneous and muscular tissues have a very slow lymphatic output amounting only, in the rabbit, to 0.06 c.mm. in a minute, whereas the serous membrane gave an average of 3.6 c.mm. in a minute, an amount very similar to that found for the eye. This shows the close physiologic relationship between the chambers of the eye and the serous cavities, a homology which is still proved by the pathologic reactions, similar in both cases.⁵

In 1917 Dr. L. Maggiore published the important monograph, quoted above, on the Schlemm canal. He was able to prove that from the morphologic point of view, the canal has not the structure of a vein, but special characteristics which make it resemble closely a lymphatic vessel. He was able, also, to corroborate the classic opinion that the inner wall of the Schlemm canal, toward the anterior chamber, is a continuous membrane and has no stomata or openings.

Direct observation of the region of the angle in living eyes from outside thru a thin sclera, was first undertaken by Fuchs in 1900, using a very strong light. He saw a dark ring concentric to the cornea with well defined margins, and concluded that the canal was filled with blood corpuscles.

Maggiore trying to repeat Fuchs' experiments under similar conditions, never succeeded in seeing the ring, and denies any value to this method.

Direct observation of the iridocorneal angle from inside was of course, the better way of solving the

physiologic problem. This examination was first undertaken by Dr. Trantas, in 1907, using the indirect and direct methods of ophthalmoscopy in a lateral position, tangent to the iris and pressing with the finger upon the eye, thru the lid, in the corresponding region. In this way he succeeded in observing the root of the iris and the internal part of the sclera, the latter as a white bright zone. Inside of the dilated pupil he could see the ciliary processes. The examination of the angle, however, was possible only in eyes with very deep anterior chamber, such as cases of keratoglobus, or in high myopia.

A great advance in the same direction was made by Salzmann⁸ in 1914, using a contact glass upon the cornea, and observing with the ophthalmoscope, by indirect and direct methods. To him belongs the credit of having solved the problem of observing the iridocorneal angle in living eyes thru the anterior chamber, giving an accurate description of its structures and behavior in normal and in pathologic cases. In a second contribution⁹ of July, 1915, he completed and perfected his methods, and devised a new contact glass instead of Fick's used before.

Altho a keen observer himself, Salzmann being imbued with Leber's ideas, had expected at first to see a broad red colored ring at the place of Schlemm's canal. He did not, and in his first paper declared the canal to be invisible, being probably concealed by the thickness of the sclero-corneal trabeculum. In his second paper, however, he modified his former views and positively admitted the Schlemm canal contained a clear, colorless liquid, and only in exceptional cases diluted blood. He was led to this conclusion by the observation of cases in which thru hyperemia of the pericorneal vascular network, or by pathologic conditions, there was clearly visible a rosy coloration near the ciliary body, in the anatomic situation of the canal.

This could not be possible if the trabeculum were so thick as to conceal the vessel behind. But even in these cases there was no question of the con-

tents being pure blood, as the color was totally different from the dark red hue of the small vessels sometimes seen in the root of the iris. The blood made itself apparent, especially by a sharp rosy coloration in the anterior edge of the canal.

Salzmann's observations have been very recently confirmed by Prof. L. Koeppé,¹⁰ of Halle, who by perfecting the technic, and as a part of his important discovery of the microscopic examination of the living eye, has made possible the observation of the iridocorneal angle with high magnifications.

He used the focal illumination of the Nernst-Gullstrand slit lamp, and observed the region thru the new Zeiss binocular apparatus called "Bitumi" for indirect and "Orthobitumi" for direct examination, giving a magnification of 40 diameters. With this instrument a stereoscopic image of the angle is obtained and by using a contact glass and a direct, indirect, or oscillatory light, all the microscopic structures of the angle can be perfectly recorded.

Koeppé also describes the Schlemm canal as a clear zone, slightly darker than the inner border of the sclera, filled with a clear liquid. Even in cases of glaucoma, this zone was not found of a red color. On the other hand, small vessels, and remnants of blood showed the characteristic red tint.

In the accompanying picture (Fig. 4) I have drawn from a case of keratoglobus especially suitable for examination without any contact glass. The angle seen by direct ophthalmoscopic examination is formed by two different parts, a colored and a white one. The colored area has two portions: a yellow flat one, the anterior surface of the iris extending to its ciliary border; and the ciliary body itself (of a brownish color), situated at a deeper level and forming the angle proper, which inserts in the inner part of the sclera by a continuous, generally ragged line.

The white zone is sometimes separated from the ciliary body by a brilliant, white, narrow line, which corre-

sponds to the scleral spur. Then comes a broad bluish-white band, the sclero-corneal trabeculum, which covers the Schlemm canal, and is sharply limited outside by a darker or brighter line, but sometimes can not be differentiated from the rest of the sclera.

Farther away from the Schlemm canal the inner surface of the sclera shows a brilliant white color, until it reaches the edge of the cornea.

In Fig. 5 (taken from Salzmann)

and occurring in a patient with tubercular iritis, the Schlemm canal has a reddish coloration, the lumen being filled with diluted blood.

Thus by direct examination of the region of the angle, heretofore entirely concealed to our own eyes, the problem of the true nature of the Schlemm canal, already solved by physiologic research, has been settled, and its lymphatic character asserted beyond doubt.

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ON FIXATION. A KINDERGARTEN EXERCISE IN OPHTHALMIC TECHNIC.

HAROLD GIFFORD, M.D., F.A.C.S.

OMAHA, NEBRASKA.

Various methods of fixing the eyeball for operations upon it are here described and their relative advantages discussed. The importance of considering minute details in regard to operative technic is thus brought out.

To fix the eyeball properly for various ophthalmic operations is a very essential bit of technic. For the ordinary *cataract incision* it is obvious that no one point of fixation can be equally good both for the puncture and the cut. For the former, the fixation is best applied at the side; while for the cut-

To fix for an incision with a spade knife, or for any of the filtration *operations for glaucoma*, it seems clear that the superior rectus offers the most favorable point. Obvious as this appears to be, the use of the upper tendon for this purpose seems to be rather uncommon. In fact the great majority of men to



Fig. 1.—Forceps used for fixation by seizing rectus tendon.

ting up, the fixation in the vertical line is desirable. The difficulty of achieving accuracy in the puncture and counterpuncture is, however, so much greater than that of finishing the cut, that the writer many years ago gave up fixation at a point below the cornea and since then has fixed by a firm grasp on the internal rectus tendon.

It is probable that this method would be in general use if it were not for the fact that most operators feel that they must have some means of holding the eyeball down if the patient tries to look up. If, however, the globe is thoroly cocaineized with a 10 per cent solution applied four or five times in the course of half an hour, or by the injection of a drop or two of 4 per cent cocaine four minutes before the operation is begun, the necessity for holding the eyeball down will seldom be felt. Fixing by the internal tendon applies the steadying force in the line almost directly opposite the puncture and counterpuncture, while with fixation above or below the globe tends to be pushed away, and rotated around a center furnished by the point of fixation.

whom I have mentioned it have never tried it. With the tendon firmly grasped by some such forceps (as that in Fig. 1) with three projecting teeth and a slide catch, the weight of the forceps holds the globe down (as in Fig. 2); so that the operator can have both hands free for other work.

Useful as this method is for operations under cocaine, it is even more so for trephinations and iridectomies under a general anesthetic. This, however, does not offer as good fixation for an ordinary cataract incision as fixation by the internal rectus, so that in operations for senile cataract under a general anesthetic the best plan is to fix both by the superior and the internal rectus tendons (Fig. 3). This double fixation is also the best means of bringing forward a sunken eyeball for a cataract operation; altho the single fixation by the internal rectus answers fairly well for this purpose.

One of the most important steps in an *advancement operation* is to take a firm hold of the tendon and maintain this hold even if the tendon has to be cut behind it, until all sutures which pierce

the sclera in lines parallel to the muscle are passed. The tendon fixation for this purpose serves better than any scleral forceps which the writer has seen.

For removing small malignant tumors a thread thru one border of the tumor plainly offers advantages over an attempt to fix with forceps; both because



Fig 2.—Fixation of eyeball by grasping tendon of superior rectus.

Where, on the other hand, the scleral sutures are to be introduced at right angles to the length of the muscle, the "spit" of Pamard, or better yet the fixation fork of Wells, gives better service.

Fixation by a strong thread can be used with advantage in a number of ophthalmic operations. At the end of an *enucleation* a thread passed thru the sclera enables the operator to hold the optic nerve on the stretch so as to materially facilitate the division of the nerve as far back as may be desired.

it is less likely to tear out and because it obviates the chance of inoculating the sound tissue with forceps which have been used on the tumor.

For all tumors within the orbit, the thread fixation is a great help. When, on making an exploratory incision into the orbit a tumor is encountered, the best plan if there is the slightest doubt as to its nature, is to fix it with a strong thread before puncturing it to determine whether it may not be a *cyst* which can be evacuated and cured with carbolic

acid or trichloroacetic acid without being extirpated. If a cyst is punctured before being fixed it may collapse so that it can not be relocated without doing un-

else. Recently, Coppez,¹ has advised fixing by both the superior and internal tendons as a regular thing in senile cataract operations. It does, as he says, give the



Fig. 3.—Double fixation of eyeball by hold on superior rectus and internal rectus.

necessary damage. If it be not a cyst, the tension which can be kept up with a thread is generally decidedly superior to that furnished by anything but strong vulsellum forceps which are apt to mangle the specimen unnecessarily.

Fixation by the superior tendon was long ago recommended by Angelucci, but until recently I had not seen any account of the use of double fixation by anyone

most complete control over the eyeball, but the control given by the internal tendon alone is so good that I have not found it necessary to use the double fixation except in general anesthesia, or where the eye is sunken or where the patient is very unruly. Perlmann² also has recently recommended a double forceps with which to fix by the superior and inferior tendons when operating for senile cataract. See p. 362.

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A STUDY OF THE ETIOLOGY OF PERIODIC OPHTHALMIA IN HORSES.

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Although the results of this study are negative, they narrow the field in which the cause of this disease is to be sought. Ordinary contagion is excluded, and the assumption raised that an organism causing it must enter the horse through some intermediary as does the malarial parasite; or the eye lesions is connected with some distant focus of disease, as in onchocercosis; or that the disease is metabolic in origin. Read before the St. Louis Ophthalmic Conference, May 14, 1920.

During the summer of 1916, periodic ophthalmia began to be prevalent among the horses of the British Expeditionary Forces. No. 19 veterinary hospital at Rouen was designated as one of the special hospitals for this disease; and it was there, thru the courtesy of the commanding officers, first Major Hodge and later Captain Stewart, that this study was made. Much of the work was performed by Captain Torrence and Captain Gofton, without whose aid this study would have been impossible.

The clinical picture identifies this epidemic with the disease described best by Bouley and Reynal¹ in 1862 under the name of "Fluxion Periodique."

When first seen by us, there was almost invariably marked photophobia, a red and swollen conjunctiva discharging profusely a mucopurulent secretion. The cornea was very hazy, in some cases being definitely opaque. This was due to an interstitial keratitis, there being no ulceration in any of the cases we observed. There was present marked circumcorneal injection and a plastic iritis, the pupil early being occluded, a gray or hemorrhagic exudate filling the pupillary space. Branching vessels extended 3 to 5 millimeters from the conjunctiva into the cornea. In every case where the vitreous could be seen, there were opacities. Both eyes were usually affected, one beginning about two weeks after the other.

Gradually the secretion would disappear, the photophobia and corneal opacity grow less and the eye become quiet. The keratitis practically always disappeared entirely. Vitreous opacities, occasional iris ad-

hesions and somewhat impaired vision were the obvious relics of the disturbance. The optic nerve was normal in the cases which we observed. Others have described optic atrophy and detachment of the retina. We did not observe either of these results in any of our cases. This, however, may be due to the fact that we seldom saw very late cases; as all such had previously been weeded out, and evacuated to areas further from the line than where we were stationed.

After six to twelve weeks these horses were returned to work. Tho we could not often follow the individual horse, we were able to determine that recurrences were common (usually in three to six months), each attack being worse than the previous one. The ultimate result was, in many cases, blindness.

We decided to confine ourselves to a determination, if possible, of the transmissibility of the disease.

The conjunctival secretion was examined by Dr. Eugene Opie and many organisms were found, chiefly staphylococcus aureus and a gram negative diphtheroid organism. This latter was isolated and unavailing efforts made to reproduce the conjunctivitis with it. The secretion from diseased eyes was placed in normal conjunctival sacs, but in no case was a conjunctivitis produced. The same experiment was repeated after making abrasions in the healthy conjunctiva, but with negative results.

Thinking that possibly the disease was acquired from occupancy of an infected stall, two healthy horses were kept for two months in stalls which had been used for many weeks for horses infected with ophthalmia. The

disease did not develop. On the other hand one horse which had been isolated in a clean stall for two months while in the hospital for pneumonia did develop ophthalmia.

Aqueous and vitreous humors, obtained aseptically from diseased eyes, were found sterile. Agar-agar, blood serum agar, glucose, gelatin and bouillon were used. Anaerobic cultures also were tried unsuccessfully. Aqueous fluid showed red blood cells; and in one specimen a coccus, probably a contamination. No organisms were seen by dark field illumination. Aqueous from acute cases was introduced into the anterior chambers of two horses. One horse was kept under ideal conditions and the other was kept in a foul, ill-lighted stable. Altho, in the latter case, certain changes were noted and the recovery was much less rapid than in the former, we could not say that the disease was reproduced. This is contrary to the findings of R. Avery,² who reports transmission of the disease in this manner.

In four cases, pieces of irides were removed aseptically from ophthalmia cases, and placed in the anterior chamber of healthy eyes. Reactions, suggestive of the disease, but not typical of it, were produced.

Blood was withdrawn from the jugular vein of two horses with the disease and cultures were made on agar and glucose and bouillon. Nothing grew from either specimen.

Fifteen cc. of blood were taken from a horse with ophthalmia and inoculated into the jugular of a well horse with no result. Thinking that perhaps an insufficient amount of blood had been used, two further transfusions were made, one of 50 cc. and one of 75 cc., each case being taken from a different horse with the disease and inoculated into a well horse. The disease was not reproduced.

Hoping that the blood might show something when examined, fresh specimens were studied but revealed no abnormalities.

A differential count with hematoxylin and eosin stain gave:

Polymorphonuclear neutrophilic leucocytes	87=60%
Large mononuclears	18=12%
Small mononuclears	32=24%
Poly. eosinophil. nuclears.....	7= 5%

In one experiment of transplanting iris, we were pleased to find that the iris came freely off from the lens capsule and hoped that in old quiet eyes when the pupil was occluded, an iridectomy might give useful vision. Altho we were able to perform the operation successfully in a few cases, we invariably found that the vitreous was so full of opacities that no visual improvement was obtained.

We used at different times three treatments.

1. Lugol's injection.
2. Subconjunctival saline injections.
3. Atropin and silver nitrat.

Captain Torrence tried, in a series of cases, the procedure of Wiggs,³ of injecting Lugol's solution deep into the orbit, but on the average the improvement was no greater in the eyes so treated than in the control eyes. Subconjunctival injections were tried in twenty cases, 5% saline being used, but no marked benefit was noted. We found the most effective treatment to be the early and prolonged use of atropin and silver nitrat.

Autopsies were made on a small number of horses having this disease. Only one showed pathologic changes in parts other than the eyes. This one had pus in the nasal accessory sinuses. One horse had spinal disease clinically but there was no change in the gross specimen, pathologically.

In conclusion, we believe that our work presents a certain amount of evidence against the theory of direct contagion in this disease.

CASE HISTORIES.

October 1, 1917, to November 15, 1917. Two horses with normal eyes were placed in ophthalmia wards where they were in stalls previously occupied by horses with ophthalmia and were in flank contact with horses which had active forms of the disease. One horse was exposed thus for five

weeks and the other for six weeks. The disease did not develop.

EXPERIMENTS WITH AQUEOUS FROM INFECTED EYES.

February 11, 1918. 1 c.c. of aqueous obtained by puncture thru the cornea near the limbus with a hypodermic needle in a case of acute ophthalmia, was introduced into the anterior chamber of a normal horse "A" which was then placed in a well lighted, well ventilated stable.

1 c.c. from same case of ophthalmia was placed in the anterior chamber of a normal horse "B" which was placed in a dark foul stable.

February 12, 1918. "A" Slight general steaminess of cornea, most marked around puncture wound. Photophobia and lacrimation. "B" Same as "A." February 13, 1918 "A" Less steaminess of cornea and no other signs of disease. "B" Increased steaminess of cornea. Small amount of blood in lower half of cornea and three flocculi in anterior chamber below pupil; marked photophobia and lacrimation. February 14, 1918. "A" Very slight corneal steaminess, no photophobia, slight lacrimation, conjunctivitis. "B" Increased and now marked conjunctivitis, lacrimation, and photophobia. Pupil narrow, reacts only slightly to light, aqueous muddy below lower pupillary margin, containing small flakes of albumin, very little hemorrhage (less than on the 13th). Slightly less corneal clouding. No vascularization of cornea. February 15, 1918. "A" Well. "B" Conjunctivitis, lacrimation, and photophobia less. Precipitate in anterior chamber is higher, and now appears as a jelly-like mass which can be moved freely about in anterior chamber by pressure on the cornea. Less steaminess of cornea and condition looks less like ophthalmia. February 17, 1918. "B" Only slight corneal steaminess and the precipitate in anterior chamber remain as abnormalities. February 26, 1918. "B" Still small amount of precipitate in anterior chamber. Eye quiet. Vitreous clear.

IMPLANTATIONS OF DISEASED IRIDES.

These experiments were performed under ether anesthesia.

EXPERIMENT 1. January 19, 1918. Iris from acute case of ophthalmia introduced into the anterior chamber of a normal horse thru linear incision, left eye. Much bleeding. January 22, conjunctiva slightly injected. Mucopurulent discharge from inner canthus. Iritis. Upper one-third of inflamed iris can be seen. Pupil and remainder of iris obscured by hyphemia. Pupillary slit distinctly seen, appears to be closed. January 23. Hyphemia rapidly disappearing. Pupil visible and slit like, but nature of vitreous not discernible. Less discharge and less photophobia. Appears today less like a developing ophthalmia. January 24. Less hyphemia. Pupil visible, narrow. Corpora nigra has increased in size and extends almost across pupil. Probable fibrinous exudate in lowest part of anterior chamber with blood above it. Vitreous cannot yet be seen. January 25. Steaminess around outer rim of cornea extending 5 mm. towards center. Slight circumcorneal injection and definite fibrinous exudate in anterior chamber. Less hyphemia. Pupil more contracted. Contents of vitreous chamber cannot yet be seen. January 27. Steaminess of cornea limited strictly to periphery. Appearance as of the 25th. Three pigment deposits on anterior lens capsule. Cannot make out condition of vitreous. January 28. Injection in region of scar more marked. Inflammation decreasing. Pupil more open. Structure of retina distinguishable, but slightly hazy. January 30. Pupil reacts to light. Structure of retina fairly clear. Disc appears as a pink blur. Whole condition looks less acute. Peripheral cloudiness about gone. Only slight injection remains and this near the scar of the incision. February 1. Whole eye better. Pupil much more dilated, reacts actively to light. Optic disc a pink blur and vessels difficult to distinguish. Three pigment spots on anterior lens capsule. February 3. No change. February 4. Iris smoother

and paler than normal, but much of its lustre has been regained. Retinal vessels still hazy. February 5. No change. February 9. Today there can be seen a definite vitreous haze composed of minute particles, lying for the most part anteriorly and in lower half of vitreous. This accounts for haziness of vessels of disc. February 14. External appearance normal.

EXPERIMENT 2. January 18, 1918. Piece of iris from an acute case of ophthalmia was inserted into the anterior chamber of right eye of a normal horse. (Keratome incision, aseptic operation, ether.) January 30. Foreign iris can be plainly seen on the iris close to the scar. There are a few blood clots and there is cloudiness of the cornea in the immediate vicinity of the incision. Pupil narrow and details of retina cannot be made out. Iris looks normal. January 31. No change. February 1. No change. February 2. Cloudiness of cornea much less marked in the region of the introduced iris and only one very small blood clot unabsorbed. Photophobia marked and fairly profuse flow of mucoid material from conjunctiva. Normal retina can be distinguished thru a narrow pupil which reacts to light. February 3. Photophobia more marked. Secretion as yesterday. Conjunctiva swollen and injected. Whole iris seems affected, presenting fawn colored appearance with loss of the crypts. Pupil does not react to light. April 2. Photophobia, lids swollen, mild iritis. Retinal structure fairly clear. Edge of optic disc can be seen and vessels are a little hazy. Pupil reacts to light and the general appearance of the eye is

better. May 2. No change. Discharge continues. July 2. Better, less conjunctivitis and discharge. Iris normal, reacts actively to light. Corneal opacity around introduced pieces of iris almost gone. September 2. Except for slight inflammation of the conjunctiva and slight photophobia the eye is normal.

EXPERIMENT 3. January 29, 1918. Piece of iris removed from an acute case of ophthalmia was introduced into the anterior chamber of a normal horse. Ether. January 30. Blood clot hanging around corpora nigra. Pupil contracted. Iris has lost its lustre. Marked cloudiness around scar. January 31. Peripheral keratitis with injection around scar. Pupil contracts. Retina seems normal but only a poor view is obtained through the contracted pupil. February 1. One end of clot has become detached from corpora nigra and is stretched across the pupil. Cloudiness of cornea seems to be extending centrally. February 2. Remains of blood clot lying in deepest part of anterior chamber. Peripheral opacity of cornea less marked. Retina normal. Very sluggish reaction of pupil to light. February 3. Peripheral cloudiness remains; this may be due to a small tag of implanted iris remaining in the lips of the wound. Structure of retina clear except for a slight haziness of vessels around the disc. Pupil reacts readily to light. Whole eye much improved. February 4. Still some injection and cloudiness around incision. February 5. Same as on 4th. February 7. Better. Peripheral steaminess gone. Slight general corneal haze. Injection about incision almost gone.

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THE INTRAOCULAR FOREIGN BODY, A SURGICAL OCULAR EMERGENCY.

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The importance of early diagnosis and extraction of magnetic foreign bodies, using the magnet without waiting for X-ray diagnosis in recent injuries is urged. Magnet extraction thru the anterior chamber, rather than by scleral incision is preferred. Read before the New England Ophthalmological Society, January 18, 1921.

Experience with penetrating foreign bodies, during a number of years' service at the Massachusetts Charitable Eye and Ear Infirmary and in France during the war, has led the writer to certain views regarding the handling of such cases, the expression of which it is hoped may be of some benefit to those men who are starting in on their career in ophthalmology and to those others who perhaps see only rarely cases of this description. In this brief note the intention is only to lay stress on a few important points which on occasions do not always seem to be taken into consideration.

It should be recognized first of all that the prognosis is always to be considered as very grave in such injuries as these and especially when the foreign body is of any size, also when it has penetrated into the posterior portion of the eyeball. A very large number of such eyes are lost either from the trauma sustained at the time of accident, thru infection, and even after a successful extraction, thru the trauma caused by the operative procedure employed. We all know, however, that a certain percentage of cases retain a fairly useful eye, and it is in the hope that this desired result may be obtained that we should approach every case which comes into our hands.

My first thesis is, that *in every injury of the eye the possibility of an intraocular foreign body should be considered*. All suspicious cases should be regarded as positive until the negative has been proved by all the diagnostic means at our command. Too often the opposite conclusion is arrived at, and, misled by a faulty history and an innocent appearing eyeball, the physician is led to assume, without complete investigation, that the eye does not contain a foreign body.

The site of a perforation is often overlooked, sometimes thru failure to examine thoroly, and sometimes because if it be in the conjunctiva covered portion of the globe it may be so small as to escape the eye, especially in the presence of an extravasation of blood and serum. This was not infrequently the case in the many injuries seen during the war, so that it eventually became the routine procedure to consider all these cases positive until they were proven negative. It was not so very rare to find a small intraocular foreign body where careful inspection had not determined a penetrating wound.

The extraction of the magnetic foreign body should be performed as soon as possible after the injury. Any considerable delay can have only harmful results. In many cases the foreign body is infected to a greater or less degree. Where the infection is virulent the eyeball will surely be lost; but where it is less severe, early extraction will probably give the eye its best chance thru removal of the infecting agent. The earlier extraction takes place, the easier it is. The longer one waits, the more fixed in position the foreign body has become.

Early extraction requires early diagnosis. Our means of diagnosis are: the painstaking examination of the eye, the X-ray and the magnet. In many cases diagnosis may be made by the inspection of the eye and by the ophthalmoscope. Where this fails the X-ray often succeeds.

X-ray.—While recognizing the great advantage to be obtained from this method of ascertaining the presence of a foreign body in the eye, and the wonderful exactness which may be secured in the localization of the bit of steel or iron, the heretical thought sometimes comes to my mind that per-

haps at times we may be over-emphasizing its importance. Perhaps our X-ray service is not as good as that of other hospitals. Altho we have our expert on hand the whole of each morning, and plates may be taken for a part of each afternoon also, nevertheless there is a tendency to lose time waiting for X-ray reports; and what is worse, a negative report has been sometimes accepted as final evidence of the absence of the foreign body.

Unless for some reason an exact localization of the foreign body is of great importance, I do not believe that a delay of many hours is justifiable in fresh cases of foreign bodies in the eye. Where the injury is a week or more old, I do not believe that such a delay makes any great difference.

Just as a small wound in the eyeball or thru the lid may escape us, so may occasionally a small foreign body escape the X-ray. This being so, I come to my most important point—the one indispensable test for the presence of a foreign body in the eye is the magnet. I do not believe this point can be too strongly emphasized. Where X-ray is not available for twenty-four hours or more, I believe the diagnosis should be made by putting the patient before the magnet. This was often the case in France, the majority of wounded eyes came in during times of stress, and with perhaps a hundred or more severe injuries awaiting their turn at the X-ray, it was often manifestly impossible to get prompt service for the eye cases. The X-ray was used as an adjunct when possible, but immediate extraction was considered of more importance than localization in all but a very few instances. The necessity of rapidly moving the cases on was also a prime consideration. In extracting a foreign body an estimate of the size is of great importance. A fair idea of this may often be obtained from the wound of entrance, and of course the X-ray gives valuable information.

In using the magnet for diagnostic purposes it goes without saying that the patient's eye should not be brought too close to an instrument of great strength. As in extraction the smallest current that will do the work is the

best, and here we are simply trying to evoke the slightest amount of pain which will tell the story. One can often evoke a pain reaction with the hand magnet, so that when the giant magnet is used for this purpose it should be used with caution.

The route of extraction of an intraocular foreign body will, I suppose, always be a debatable point. On the face of it, it would seem that exact localization, posterior incision and removal with the small magnet was the simple and less complicated procedure. It would certainly appear that this route is the choice of a large majority of colleagues in this country. It was my choice also until the experience in France with the observation of a vastly larger number of cases than I had ever seen before; and careful consideration of the two methods led me to adopt the anterior route except in the cases of the larger foreign bodies where the lens is uninjured.

It seems beyond question that a foreign body that is not too large may be drawn around the lens into the anterior chamber without appreciable damage to the eye; and it is also beyond question that posterior puncture of the eyeball with hemorrhage and the formation of fibrous bands frequently leads to detachment of the retina. A foreign body once in the anterior chamber may be extracted without the introduction of an instrument into the eye other than the keratome with which we make the incision. Where the foreign body is so firmly fixed posteriorly that it cannot be drawn forward, I grant that exact localization and posterior incision must be employed, but this is comparatively seldom the case.

The removal of an intraocular foreign body is an operation that requires a high degree of surgical knowledge and skill, and should only be performed by those who have had the opportunity to perfect themselves. Many eyes are lost through unwise and unskillful manipulations. Wherever possible, I believe that all these cases should be referred to the hospitals which are fitted with proper equipment and whose staff is well versed in this line of work.

INJURIES TO THE EYE WITH REPORT OF 1051 CASES.

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This is an analytic account of the cases seen in a period of two years, giving the kind of history obtained, the clinical data brought out in the two classes of cases, minor injuries and major. The diagnosis including the importance of the history and the use of the X-rays is discussed. The removal of foreign bodies from inside of the eye is considered with results from twenty-four magnet extractions. The importance of early diagnosis and treatment is insisted upon.

It is common knowledge that the medical profession, in general, finds it difficult to be interested in any paper or discussion concerning the eye. This lack of interest manifests itself early, in fact, at the time we receive our first instruction in ophthalmology as medical students. One of the great reasons for this lack of interest is the absence of evident practical application in the subject matter presented.

Injuries to the eye, their proper treatment and management, will always be classed as one of the most important subjects that the oculist has in his work. In many ways it is none the less important to the medical profession in general. The object of this paper is to give a synopsis of 1051 cases of industrial injuries to the eye, which have been treated in our office in the past two years. We endeavor to emphasize those points which, to us, seem most important and of practical interest to the oculist and to the general medical profession.

In treatment of the eye, as in other branches of medicine, a good history and a carefully kept record should be the first essentials. We have taken for this series, as nearly as possible, a uniform history covering the following points:

1. When injured.
2. The type of work engaged in when injured.
3. The nature of the injury.
4. A statement concerning previous disease of the eye or eye injury; also concerning such subjective symptoms as pain, photophobia or blurring of the sight.

The vision in each eye was recorded at the time of the first visit at the of-

fice, also at later visits, and upon discharge; careful record was made of the condition found at the initial examination and of the subsequent progress of the case. We have mailed to the company employing the man injured, a copy of the original record, also a copy of the notes made at the subsequent visits and of all X-ray and laboratory reports. When the case is closed the company has an exact duplicate of the record as it occurs in our office.

Such a scheme has many advantages, some of the most noteworthy being that it enables "the shop" to be in constant touch with the progress of the case, also to "follow up" and see that their men come regularly for treatment. It at once stimulates and maintains an interest in the case.

CLINICAL DATA.

From a study of such a series one is able to determine a number of essentially important factors in eye injury. The data accumulated will show:

1. *The type of work responsible for the greatest number of our cases.*
2. *The work offering the greatest number of serious injuries and the converse.*
3. *What per cent are seen at an early date following the injury, and an approximate estimate of the influence this has on the recovery of the case.*
4. *We will see emphasized the importance of the X-ray in the diagnosis of metallic bodies, and the valuable assistance it affords the surgeon who is called upon to remove same.*
5. *We can determine what per cent of eyes have been lost and some of the contributing factors. These are the practical points we wish to emphasize.*

In our analysis of this series we find the type of work responsible for the

greatest number of our cases is seen to be the steel group, with emery grinding as a close second; the latter having just 37 cases less than the former, and the two groups together being responsible for 81.3% of all our cases. We see, therefore, that in eye injuries of this series we have patients coming from two great classes of work—those working on steel, like hammering, riveting, drilling, etc., and those working on emery.

For the purpose of study we may divide these cases into two groups: 1. *The minor injuries*; those with foreign bodies embedded in the coats of the eyeball and not perforating to the interior of the eye; nonperforating cuts and lacerations; first and second degree burns, etc. Most of the cases come in this group. 2. *The major injuries*; those in which the injury is of a more serious nature; such as perforating wounds of the eyeball with and without retained foreign bodies, third degree burns, and rupture or detachment of the coats of the eye. Of the total 1051 cases, 81 are found to come in the group of more serious or major injuries, or, in other words, 7.9% of the cases sent to our office have proven to be major injuries. This percentage is considerably lower when figured on the total number of injuries occurring in a large plant where all the cases are cared for.

The greatest number of our minor injuries occurred in the emery class, 406 cases, as compared with the next largest number, 389, in the steel group. In reality, as to the occurrence of minor injuries, there is little difference in these two classes of work, only 17 cases more occurring in the emery than in the steel. Quite the converse is true when we look at the major injuries. *Fifty-eight*, or 71% of the total number of the major injuries, are chargeable to steel work, and only two major injuries occurred in the emery class. To know the type of work the patient was engaged in when injured is of no little importance. It should be noted on the history in the form of a permanent record.

We have been interested to note whether one eye is more often injured than the other. In 1906 Sweet¹ reported a series of 420 cases of eye injuries from foreign bodies. In these he found that

178 were injured in the right eye and 242 were injured in the left eye—54 more in the left in a series of 420. He explains the prevalence of injuries to the left eye as being due to the right hand position, which the majority of men assume while working. In our series the two eyes share more equally, only 23 more being injured in the left than in the right, in a series of 1051 cases. We would conclude that the two eyes share about equally.

The small number of major injuries, only 7.9%, would seem to indicate that much has been accomplished by the "Safety First" campaigns and by the efficiency engineer. We believe that many of what originally are simple minor injuries, thru one cause or another, become or are converted into a more serious condition. It is this feature with which we are particularly concerned in this paper. It is here that the general medical profession can be of great assistance. *The delay in proper treatment is one of the most potent factors responsible for permanent injury to the eye.* It is here that we should seek closer cooperation between the physician, who sees the case in general practice, and the oculist.

In trying to make some estimate of the time which intervenes between the occurrence of injury and treatment, we find in this series that only 17.5% were seen at our office on the day that they were injured, 43.5% on the second day, 17.5% on the third day, and 21.5% waited four days or longer before they applied at our office for treatment. We consider these figures very significant. When we know that routine culture shows that pathogenic organisms can be grown from a large number of the apparently normal conjunctivas, the importance of prompt attention to the injured eye becomes apparent.

The outer layers of the eye, and especially of the cornea, act as nature's barrier to infection, just as an intact skin surface does not permit organisms to pass and infect the deeper tissues. When the outer layers of the cornea are destroyed, either by the instrument used to remove the foreign body or by the foreign body itself, nature's means

of preventing infection has been greatly handicapped. A most unpleasant chain of events may follow; the case may go on to ulceration and abscess of the cornea, or hypopion and perforation, then infection of the vitreous and panophthalmitis, a condition requiring that the eye be enucleated, while in the case limited to abscess of the cornea, healing may leave a dense scar which will permanently impair the sight.

earliest possible moment, and in all cases where the iris has prolapsed between the cut surfaces of the wound. If this condition is neglected and the wound is left gaping, infection may extend to the interior of the eye. If this catastrophe is escaped the iris will become firmly healed into the corneal scar. This point of anchorage will be a constant source of irritation to the injured eye, often resulting in iridocy-



Fig. 1.—Extensive scarring of the right cornea resulting in permanent impairment of the sight. The result of infection following a minor injury; a foreign body embedded in outer layers of cornea. Was not seen until four days following injury, when he showed extensive abscess.

Thus we see that a simple minor injury of a foreign body embedded in the cornea, that is not promptly and properly treated, may cause permanent impairment or even complete loss of an eye.

The time element is even more important in the case of the major injuries. In this group we find two types of cases which are most often pitfalls for the medical profession. First, the cases with a perforating wound and a prolapse of the iris. As a rule, the perforation will be thru the cornea and the iris is found sticking out between the margins of the wound; it is here that a simple operative procedure, one not requiring even a general anesthetic, when promptly done, will often save an eye. The operation we speak of is an iridectomy. It should be done at the

clitis and secondary glaucoma, and may even cause a sympathetic involvement of the uninjured eye. Also, the pull exerted by the adhesion will distort the contour of the cornea and cause the vision to be greatly reduced. If the lens has not been injured, and the case is seen early, a very satisfactory result may follow an iridectomy. In this series 23 cases required an iridectomy, 6, or 23.8%, having a normal vision after the operation. Without an operation the vision in most of these would certainly have been very poor, and many of the eyes would possibly have had to be enucleated.

The second group of cases in which we are most likely to make a mistake is where we fail to recognize that a foreign body is retained within the eye. It is in this group of cases that the

X-ray is our most valuable aid, not only in making the proper diagnosis but also in determining what shall be our plan of procedure. First, we must impress upon ourselves the extreme importance of the removal of all foreign bodies retained within the eye, at the earliest possible moment. This means that the diagnosis must be made not at the second, third or fourth visit the man makes at the office, but the diagnosis

eled if one would diagnose the case early. The importance of the history is emphasized by the fact that twenty of our X-rays were positive for metal inside the eye, and all of these occurred in the steel group. We should go on the assumption that all cases with a history of injury while working with metal have a foreign body retained inside the eye, and then set about to prove or to disprove it at the first visit.

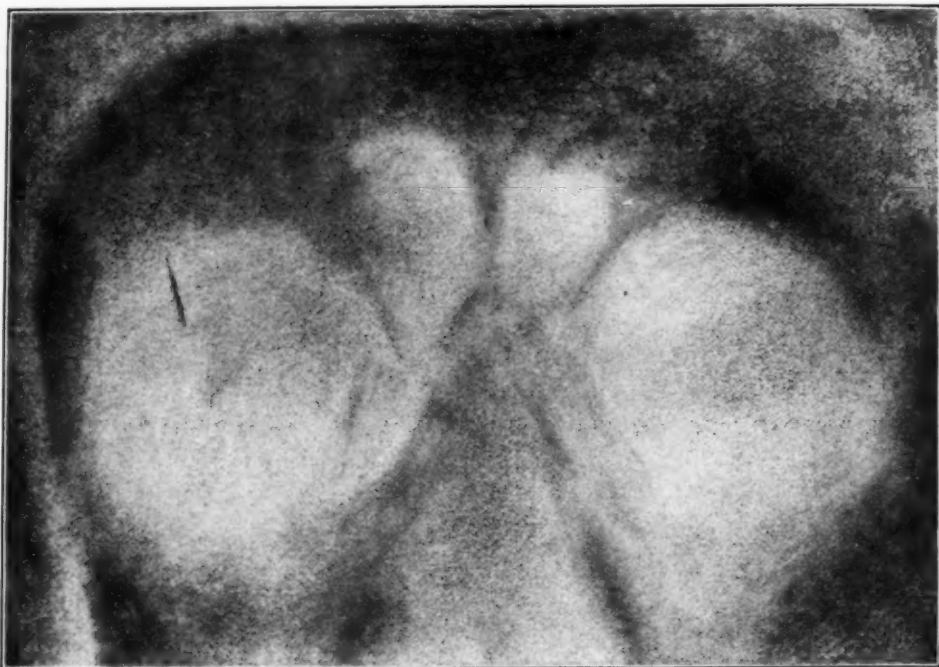


Fig. 2.—X-ray taken in the early part of 1897 of a long sliver of steel in the right eye, which was successfully removed by a magnet. Shown here for historic interest.

must be made on the first visit, and if the steel is within the eye it must be removed as soon as possible, the one exception being where the foreign body is completely embedded in the lens.

DIAGNOSIS.

One may ask: How can we most often make the diagnosis on the first visit? And the answer is: By taking a history, such as we have outlined at the beginning of this paper, together with a careful ophthalmic examination, supplemented by the X-ray. This is the exacting path that must be trav-

One must have an X-ray in all doubtful cases. To emphasize this point strongly, we cite three cases in this series, with normal vision and in which the one positive finding was a complaint of severe pain. It was this, and the nature of the work engaged in when injured, both of which were elicited in the history, that prompted us to have an X-ray.

It was soon after Prof. Roentgen published his classical papers that Dr. Campbell first had an opportunity to make use of the X-ray as a method of ocular diagnosis. A man who had re-

cently been injured with a piece of steel was seen at the office in the early part of the year 1897. His eye was deeply inflamed and the vision reduced. Was there a piece of steel inside of that eye and, if so, in what part of the eye was it located?

At that time Detroit, if not the entire state of Michigan, could boast of but one X-ray machine in its vicinity. It was owned, not by a medical man, but by a Mr. S. M. Keenan, who had his apparatus set up at Eloise, Michigan. It was there that our first X-ray of a metallic foreign body retained inside of the eye was taken. At that time Sweet² had not perfected his method of localization, the accuracy of which, now, in the hands of one who is skilled in that work, is almost uncanny. But by this new procedure it was possible to state positively that the man had a piece of steel inside of his eye and, in a degree, determine its location. A scleral puncture was made and the steel removed by the use of the early type of Hirschberg hand magnet. This is one of the earliest, if not the first case, in which a metallic foreign body was located within the eye by the X-ray, and successfully removed by the use of the magnet—a few months over a year from the date that Roentgen first announced his discovery of the X-ray. There was a case reported by Dr. Chas. R. Williams,³ in Boston, which precedes this case by a few months. They identified the foreign body by the X-ray; but unfortunately it was not magnetizable and so could not be removed by the use of the magnet.

Since this early date we have had excellent service from the X-ray. If we consider our series from the point of the X-ray, we see that, out of 1,051 cases, 117 or about 11.1 per cent required an X-ray before a positive diagnosis could be made. In no case have we failed to diagnose steel inside of the eye. Of the 117 cases X-rayed, 17 per cent were positive for steel inside of the eye, and all of these were diagnosed on the date of their first visit in the office.

It is a point of some practical importance to emphasize that all the positive X-rays occurred in the steel group; also of the 438 cases injured while working on the emery wheel, only two required an X-ray and both of those were negative. With this in mind, we can more intelligently advise concerning the need for an X-ray.

REMOVAL OF FOREIGN BODY INSIDE THE EYE.

Once having diagnosed and localized a foreign body inside the eye, how shall we proceed to remove it? As we read the literature, we find a great difference of opinion on this question. The great majority of such foreign bodies are metals, which are attracted by the magnet. Such being the case, all are agreed that the most expedient means of attack is by use of the magnet.

Shall we use a large or a small magnet? Remove the foreign body thru the anterior chamber, known as the anterior route, or by a scleral puncture, known as the posterior route? These are questions on which oculists are divided, and are questions which will be of little profit to discuss here. Rather, we will point out a few of the more interesting and important features as they have occurred in the magnet work for this series.

We have had but one case where we were not able to remove the steel by the magnet. This was a case where a very small piece of steel was embedded in the ciliary body. Two attempts were made to remove this, first thru a scleral puncture just back of the ciliary body, and second thru a keratome incision in the cornea, both of which failed. After a stay of ten days in the hospital the man had a normal vision, the congestion in the eye had cleared up, and there was no pain. There were two things one might do in this case. First, one could cut down thru the ciliary body and possibly get the steel. The other plan would be to allow the steel to remain in the muscular coat of the eye and observe it for irritation or siderosis. We chose the latter, and when the case was last seen, 10

months after the injury, he was having no trouble with the eye.

We have had in this series four cases of steel embedded in the lens. If the steel is completely embedded in the substance of the lens, we have preferred to wait until the cataract is mature and then, by extracting the cataract, remove the steel at one and the same operation. In this series we had one such case with a vision corrected by glasses

to 6/5 following the operation, or 2/10 better than normal vision. If one end of the foreign body is sticking in the lens, leaving a portion of the metal in contact with the aqueous, we then proceed to remove the foreign body at once thru a keratome incision in the cornea. In this group there are three cases of steel in the lens which were removed in the above manner. Two developed traumatic cataracts, while

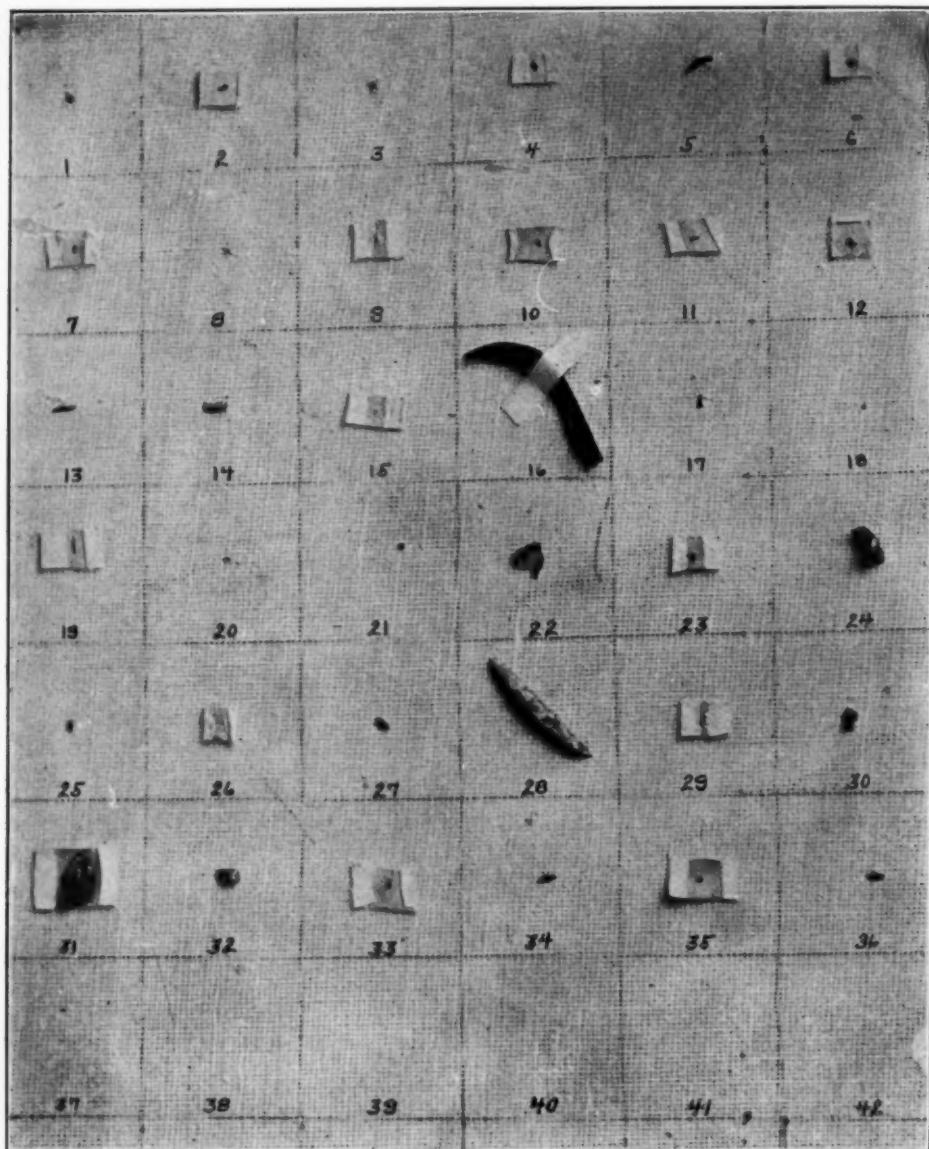


Fig. 3.—Specimens of steel removed from inside the eye by giant magnet, two-thirds actual size.

in one case the lens remained clear up to 4 or 5 months following the injury, at the time last seen in the office.

A foreign body located in the anterior or posterior aqueous chambers, we believe, should, in practically all cases, be removed thru the cornea. In cases where the foreign body has passed thru the cornea and the lens with a resulting traumatic cataract, and it is shown by the X-ray to be located in the vitreous or in the coats of the eye, it may be removed by the anterior route, if the foreign body is not so large as to unduly endanger an entanglement of the iris or ciliary body. In most of our cases localized in the vitreous, we have removed the foreign body thru the sclera. Certainly, if the anterior segment of the eye is intact and the lens is not injured, we would remove the foreign body thru the sclera, and not drag it forward as Haab⁴ advises.

We wish to report on 24 cases of steel inside of the eye, four of which did not occur in this series. Eleven of the 24 or about 50 per cent had a vision of 6/7 to .5, or practically normal, following the operation for removal of the steel. Six of these were operated by the posterior route, four by the anterior route, and in one the steel was removed with the lens at the time of the cataract operation. Eight of these cases have been seen within the last few months at the office, ranging from ten to eighteen months since their operation, and the vision given is on the basis of this last examination. Nine of the 24 following the removal of the steel had the injured eye enucleated, either because of infection or irritation. Two others were advised to have this operation, but refused it, and one because of the extensive scarring on the cornea had a vision of less than 1/10 normal. This compares very favorably with the reports we find in the literature.

The after-treatment of the case is of no little importance, and is more difficult to carry out than in most surgical cases. A working man who feels well will find it difficult to understand why he should be in bed and on his back for

ten days to two weeks, following the removal of the smallest piece of steel from his eye. But experience has taught us that such precaution is well taken. We believe detachment of the retina is reduced to a minimum by such a procedure.

For the sake of completeness, it cannot be a mistake to say a few words concerning the treatment of the minor injuries. Here three points are worthy of special mention: 1. Relative to the removal of foreign bodies embedded in the outer coats of the eye. By far the greatest number of these will be found on the cornea. 2. In removing any foreign body from the eye, only sterile instruments should be used. 3. The foreign body should be completely removed. Any stain or pigment left at the margins of the wound will keep up the irritation and cause the patient a great deal of discomfort. In our eagerness to remove all the foreign substance, we should disturb the layers of the cornea as little as possible, and all cases should be followed up and observed for infection.

To summarize the points of interest and practical importance:

1. In this series we have two great classes of work responsible for most of our cases, namely, emery grinding and steel or metal work, the two totaling 81.3 per cent of all the injuries.

2. That by far the greatest number of our major injuries occur in the second group, i. e., those working on metals.

3. Taking the series as a whole, about one case in every thirteen, or 7.9 per cent, were major injuries, while in the cases occurring in the steel group one out of every eight cases, or 12.9 per cent, were major injuries, the percentage being much higher in the steel group.

4. That better than one in ten of all our cases have required an X-ray, before we could be positive that a foreign body was not inside the eye.

5. 117 X-rays were taken, and 100 of these occurred in the steel group.

6. 20, or 17 per cent of the radiograms taken were positive for foreign

body inside of the eye, and all these occurred in the steel group.

7. The danger signal is that 71 per cent of our major injuries occurred in the steel group, all our positive X-rays occurred here, and 60 per cent of the eyes lost, or blind, were chargeable to metals. Such figures should cause us to adopt the attitude that all cases injured while working on metals are serious, and to treat them as such.

8. The magnet operation, as such, can be considered quite successful; we were able to remove the magnetizable foreign body in 95 per cent of the cases.

9. 23.8 per cent of the cases on which we did an iridectomy had a normal vision following the operation.

10. 68.5 per cent of the eyes in which the sight was lost had to be enucleated.

11. Only 17.5 per cent of the cases were seen at our office on the day they were injured, 43.5 per cent on the second day after their injury, 17.5 per cent on the third day, while better than 1/5

of the cases, or 21.5 per cent waited four days or longer, before they applied at the office for treatment. These last figures, we believe, are very important. Delay in the making of a correct diagnosis, and delay in the instituting of proper treatment are two of the most potent factors responsible for permanent injury to the eye, and are responsible for not a few of the artificial eyes that we see.

If the results here reported are to be classed as a meritorious showing, certainly the credit is to be shared with those surgeons and general practitioners who early in their cases, have realized the necessity for special examination or treatment. If the number of eyes enucleated or permanently impaired are to be materially lessened, then we must strive to obtain a higher grade of ophthalmic judgment, not only in the oculist but also in the general medical profession. The delay in correct diagnosis and proper treatment must approach a minimum.

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SELF INFLICTED EYE INJURIES.

MARC LANDOLT, M.D.

PARIS.

The writer confirms some of the recent observations regarding self-inflicted injuries of the eye and records a case in which, on two occasions, a penetrating wound of the cornea was made with the intention of producing traumatic cataract.

Every oculist who served during the last war had occasion to observe cases of conjunctivitis induced in the manner described by Dr. Danis in his concise and interesting article in the August, 1920, number of this Journal. I take up this subject simply to corroborate the fact that it was particularly among the soldiers of the Colonial Infantry that this practice was most common; it was from them that the other troops learned their lesson. I regret that their pupils were found to extend into the neighboring army.

The first cases of this kind that I treated, before I was aware of this condition of induced conjunctivitis, showed for the most part traces of an old trachoma, so that I believed I had to deal with a bona fide affection of the eyes. The list of remedies administered in the two remarkable cases reported by Dr. Friedenwald (A. J. O. v.3. 858) have most vividly recalled to me all the worry I caused to these, after all pitiable fellows. Later on, with quite different treatment, the result was much better and much more prompt. "This peculiar form of conjunctivitis," I used to remark quietly, "bears a direct relation to digestive disorders. This man must be kept in bed, on absolute diet." Very rarely did the disease last more than 4 or 5 days.

I remember having found a sign, of more than probable significance, for conjunctivitis provoked by the application of soap, in the formation of a white precipitate (oleo-margarate of zinc probably) when a drop of our collyrium of sulfate of zinc, two and a half per cent, was instilled into the eye. This precipitate, for example, does not form in the case of irritation due to the application of cigarette ash.

This last form was very rare, compared with conjunctivitis due to ipecac.

As for the conjunctivitis induced by the castor bean, the appearance is so characteristic, that there is no question of doubt, unless the process is quite improved. For the moment the individual is content to introduce into the lower cul de sac a smaller or larger fragment of a bean, stripped of its shell, there follows a white eschar, sharply defined, covered by a thick false membrane, consisting of two parts which exactly correspond to each other, on the bulbar and on the palpebral conjunctivae. No ocular affection can be confounded with this conjunctivitis.

Besides the conjunctivitis I wish to state that many years ago I saw, among a group of Russian emigrants, who were passing thru France on their way to the United States, a man who exhibited at the center of his right cornea, a speck in the form of a regular quadrangle with sides measuring 3 to 4 mm. and of a very white color. It was an erosion, artificially produced, and rendered opaque by the application of acetate of lead. This eye had been mutilated in order to escape military service. I am sure our American colleagues have seen many analogous cases.

The following is, however, the most curious case I have ever observed, and is now published for the first time. At the beginning of September, 1912, I was consulted by a young man of fine appearance, presenting in the right eye a perforating wound of the globe, about a half centimeter in length, straight and vertical, exactly across the limbus, in the middle and below. A droplet of the vitreous was oozing from the wound. There was a moderate hyphema. The pupil was transparent. The patient was extremely anxious to know if this wound would produce a traumatic cataract.

Questioned as to the origin of the injury the young man explained that on

the day before, at Lausanne, as he was coming down a stairway with an open knife in his hand, he stumbled and injured his eye. In order to be treated here, he had taken the first train out, spending the night in traveling; no dressing whatever having been applied to the eye. I was greatly astonished, but I had no reason, at that moment, to doubt the veracity of his story.

That same day I sutured the globe. The recovery was uneventful. The sutures were removed in five days.

About the middle of October my patient asked me for a certificate stating the condition of his eye. He had several flakes in the vitreous, the pupil was slightly irregular; the vision was 0.2.

The patient never returned to get his certificate, which I have just found among my papers. I decided afterwards that he had simply wished to know what his acuity of vision was, and if a traumatic cataract had developed.

Six months later I was called to the house of the same patient. My astonishment was extreme when I found in the same eye, exactly in the same place, a perforating wound almost identical with the first. This time, without any deception, he confessed at once that this injury as well as the first, was self-inflicted. Before a mirror, in perfect tranquility, this fellow had, with a penknife, actually perforated his own eye, in the ciliary region. And he had done this twice!

A suture was not necessary this time. The wound healed without further trouble.

Such a self mutilation, certainly unexpected in a young man who not only stood high socially, but also occupied a prominent place in the public eye (sharper delineation is not permissible), is explained, without being excused, by certain features of the French military law in force at that time.

All men were required to do three years' military service. However certain classes of students needed only to serve one year, on condition that they would have attained, before their 27th year, certain degrees, such as Doctor of Laws, Doctor of Medicine, etc. If at this age they had not fulfilled this condition they were recalled to serve the other two years.

My patient seeing the approach of this limit, and being far behind in his studies, had had recourse to this desperate means to attempt to disqualify himself for military service. He had wished to cause a cataract in his right eye. We have seen that in spite of his perseverance he was unsuccessful.

In this case, if I understood correctly, besides the ennui of having to do two years of supplementary military service, there were also certain nuptial projects which would have to have been postponed or broken off entirely in such an event.

I do not know what has become of this man. I do not know what he did from 1914 to 1918.

I am very much indebted to Dr. Reder, of The American Hospital of Paris, for his kind translation of this paper.

HEREDITARY OPTIC ATROPHY.

J. MILTON GRISCOM, M.D.

PHILADELPHIA, PA.

The author was able to observe nine cases of this disease affecting two generations of a family. He also reviews some of the more recent literature regarding it and inclines to the view that a low grade toxic retinitis may be the essential lesion. Read before the American Ophthalmological Society, June, 1920.

In a communication before this Society in 1918, Zentmayer thought that the data regarding the etiology of hereditary optic atrophy were insufficient from which to draw conclusions. With the idea that the description of a previously unrecorded family pedigree chart, physical and X-ray findings,

ual procedure in Leber's disease. In the second generation of 9 members, 7 have poor vision—3 females and 4 males. In the third generation of 22 members, 6 have visual difficulty—3 males and 3 females. In one instance an affected father has an affected daughter—the only offspring. In 2

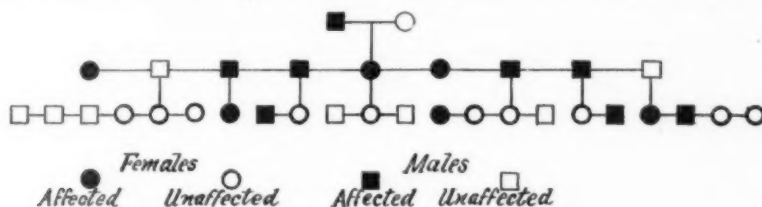


Fig. 1.—Diagram of pedigree of family affected with hereditary optic atrophy.

might serve as an additional piece of evidence, from the accumulation of which more definite conclusions may finally be drawn, the following report was considered worth presenting.

The papers of Beers, Leber, Nettleship, and Wilbrand and Saenger have made the clinical characteristics of this disease so well known that no attempt will be made in this communication to further describe them.

The accompanying pedigree chart demonstrates graphically the affected and unaffected members in the family which is the basis of this report. In three generations of 33 individuals there are 8 males and 6 females affected, 8 males and 11 females unaffected, by the disease. In the first generation the father had poor vision, and, altho there is no record of an examination, it is safe to assume that the difficulty lay in the optic nerve and retina. The mother is still living and has good vision, so that the affection was transmitted to the second generation thru an unaffected female, which is the us-

cases affected fathers have each 2 children—an affected son and an unaffected daughter. In one case, an affected mother has 3 children with good eyes; in another, an unaffected father has 4 children—2 affected and 2 unaffected. In the matter of transmission, therefore, no regular rule exists in this family, males and females being affected about equally.

The writer has had the opportunity to examine 6 of the 7 affected members of the second generation, and 3 of the 6 affected children in the third generation. The patients were well nourished, intelligent individuals without any evident inherited deficiencies except poor vision, which in each case began in early childhood. There was no consanguinity. Externally their eyes were normal in all respects, with full ocular movements and prompt pupillary response to light and accommodation. However, there was a variation in the fundus and visual field findings in certain respects as detailed below.

Mrs. L., aged forty-six. V.R.E.=10/20. V.L.E.=10/200. Corrected vision, O.D. — 1.00 cyl. ax. 180° = 18/200; O.S. — 3.00 cyl. ax. 180° = 20/200. In each eye there were a few floating vitreous opacities, the discs were oval, axis 90° ,

ing the blind spot and located down and out about 10° to 30° from the point of fixation. In the left eye there was a nearly complete annular scotoma and a small relative scotoma.

C. M., male, aged thirty-six. V.R.E.

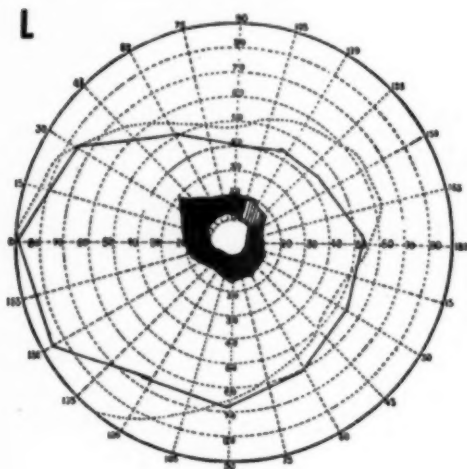


Fig. 2

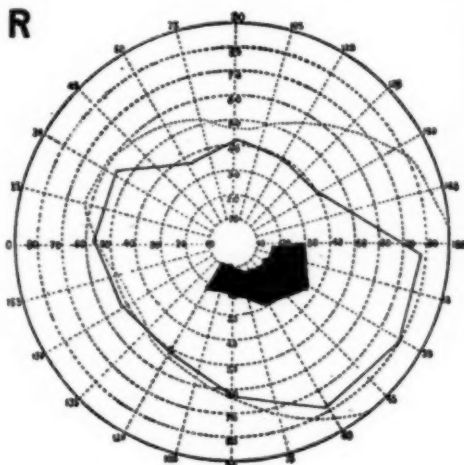


Fig. 3

Figs. 2 and 3.—Field of vision of Mrs. L. No color vision central or peripheral.

very pale, margins well defined, lamina cribrosa not visible. Both arteries and veins very small; no macular or peripheral lesions. The visual fields showed full form, but no central or peripheral color fields. In the right eye there was a paracentral absolute scotoma involv-

=20/200; V.L.E. =20/70; not improved by glasses. Both eyes: Media clear, discs oval, axis 90° , well defined, pearly white, central cupping and visible lamina cribrosa; vessels were normal in size and contour; macula and periphery normal. The right field was

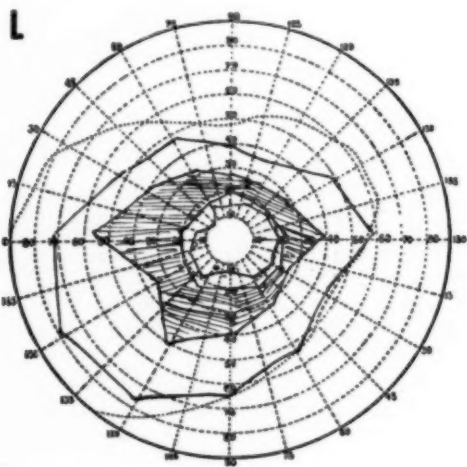


Fig. 4

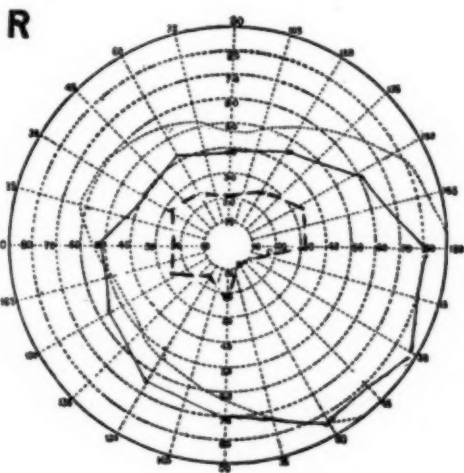


Fig. 5

Figs. 4 and 5.—Fields of C. M. No field for green. R. field for red shown by inner broken line.

full for form, the red field somewhat irregular and contracted to within 30° , with no central or peripheral green vision. In the left eye the form field was full, the red field much contracted, no green vision, central or peripheral,

white, margins well defined, lamina cribrosa visible, and a complete narrow ring of choroidal atrophy surrounding the disc. The vessels were thread like in size; maculae showed a fine pigment disturbance, and in the periphery

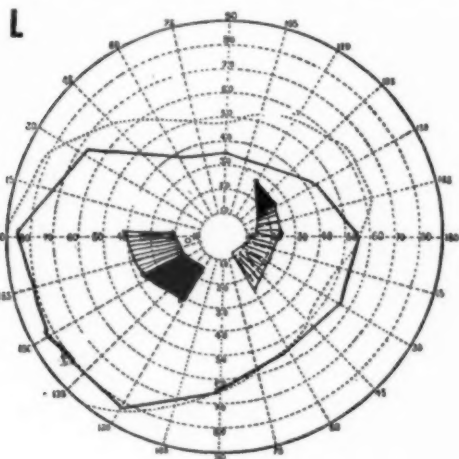


Fig. 6

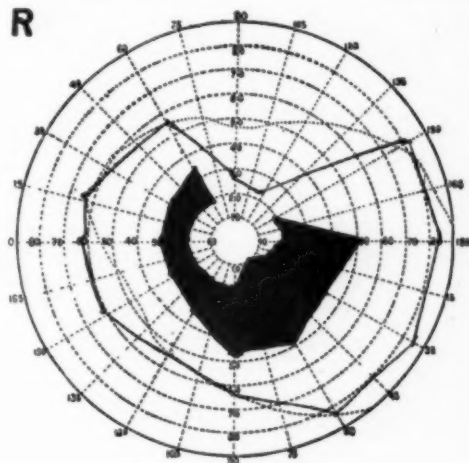


Fig. 7

Figs. 6 and 7.—Fields of Mrs. P. who had central vision for blue, but had no red or green vision.

and between the form and red fields there was a relative annular scotoma.

Mrs. P., aged thirty-four. V.R.E. = 18/200. V.L.E. = 18/200. Corrected vision, O.D. — 1.00 sph. = 20/200; O.S. — 1.00 cyl. ax. 90° = 20/100 part. In both eyes there were many fine vitreous opacities, discs oval, axis 90° , pearly

there were a few spicule like pigment areas overlying the retinal vessels. In the right eye the field for form was practically normal; there was no central or peripheral vision for blue, red, or green, and lying within 20° of the point of fixation was a sector like absolute scotoma. In the left eye the

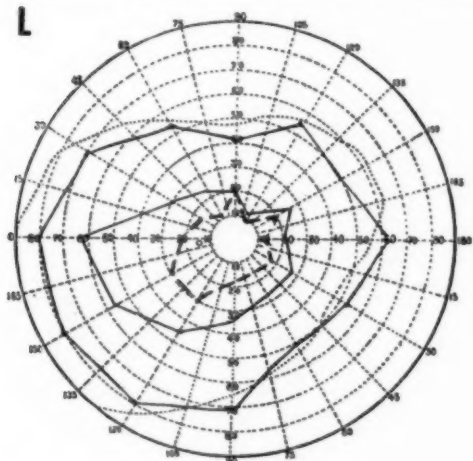


Fig. 8

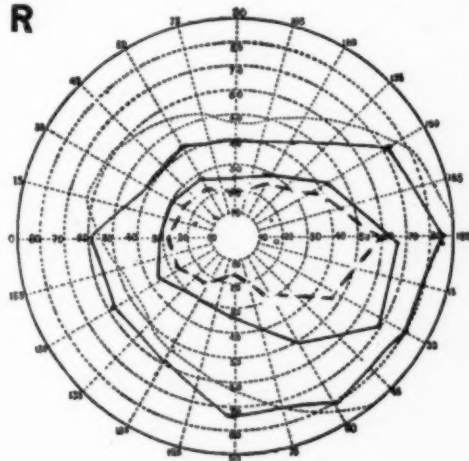


Fig. 9

Figs. 8 and 9.—Fields of C.M. Inner continuous line blue fields boundary; broken line boundary of red fields. No perception of green in either eye.

form field was full; there was no central or peripheral field for blue, red or green, and located on both temporal and nasal sides of fixation were two relative and two small absolute scotomata.

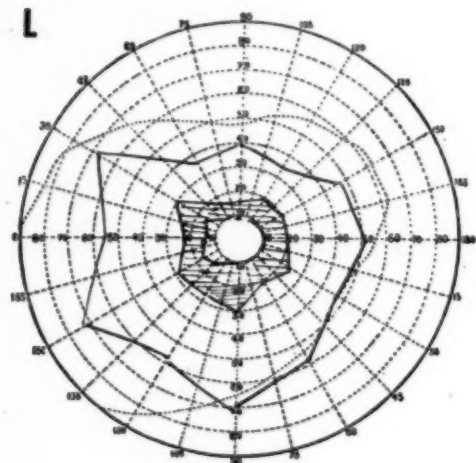


Fig. 10

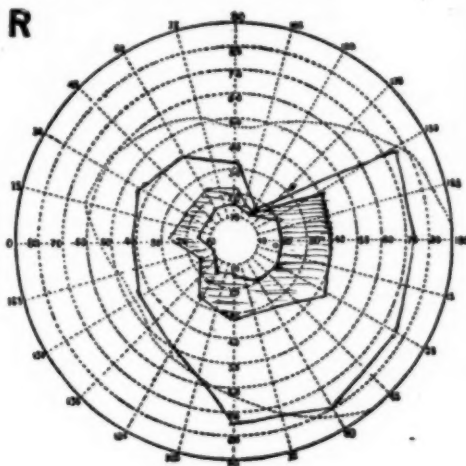


Fig. 11

Figs. 10 and 11.—Visual fields of R.M. No color vision.

C. M., male, aged thirty-two. V.R.E. = 20/100; V.L.E. = 5/200. Corrected vision, O.D.—0.75 sph. \ominus 0.75 cyl. ax. 90° = 20/50; O.S. — 1.50 sph. \ominus 0.75 cyl. ax. 90° = 20/200. In each eye media clear; disc well defined, physiologic cupping, lamina cribrosa visible, pearly white on the temporal and somewhat

R. M., male, aged thirty. V.R.E. = 10/200; V.L.E. = 10/200; not improved by glasses. Both eyes: media clear, discs round, pearly white, margins well defined, lamina cribrosa visible. Vessels almost thread like in size and can be seen only about one disc diameter from the disc margin. Retinae

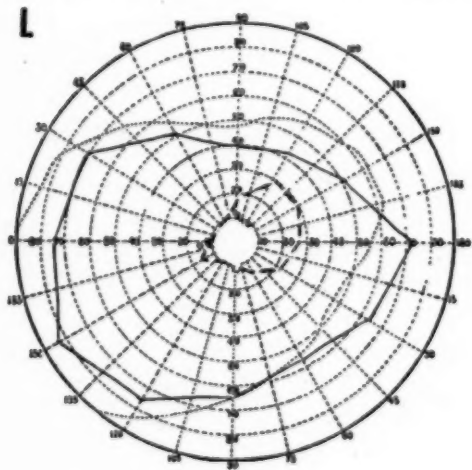


Fig. 12

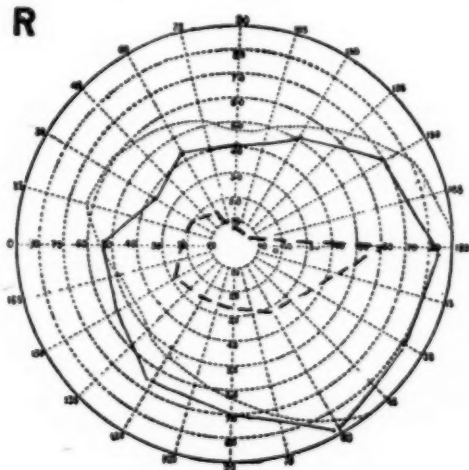


Fig. 13

Figs. 12 and 13.—Visual fields of Mrs. G. Broken line boundary of field for red. No central or peripheral vision for green.

finely granular thruout, and a few pinpoint, glistening spots and fine pigment deposits seen in the macular region. The fields for form were slightly contracted in one or two segments. The red field was contracted to within 20° in the right eye and 10° in the left eye. No central or peripheral vision for green. Just outside the red field there was an annular relative scotoma occupying a zone about 20° wide.

Mrs. G., aged twenty-seven. V.R.E. = 20/100; not improved by glasses. In each eye the media were clear, disc round, well defined, very pale, physiologic cupping, lamina cribrosa visible. The vessels were slightly smaller than normal, macula and periphery normal. The visual fields were full for form, the red field irregular and somewhat contracted, no central or peripheral vision for green.

I. M., female, aged eight. V.R.E. = 20/200; V.L.E. = 20/200; not improved by glasses. In each eye the media were clear, disc oval, axis 90° , well defined, very pale, especially on the temporal side, central cupping, lamina cribrosa visible, vessels normal, macula and periphery normal. Visual fields could not be satisfactorily taken.

A. M., male, aged six. V.R.E. = 20/70 part; V.L.E. = 20/70 part; not improved by glasses. In each eye the media were clear, discs oval, axis 90° , well-defined margins, physiologic cupping, lamina cribrosa visible, vessels normal, macula and periphery normal. Fields could not be taken.

R. M., male, aged six. V.R.E. = 20/50; V.L.E. = 20/50 part; not improved by glasses. In each eye the media were clear, disc oval, axis 90° , slight pallor on temporal side, margins well defined, physiologic cupping, vessels normal, retina slightly granular. Fields could not be taken.

Consideration of the above fundus and field examinations, together with the family history of inheritance, led the writer to class these cases as hereditary optic atrophy, in most particulars of the type described by Leber. A thoro general examination of these cases revealed negative heart, lung, urinary and blood Wassermann

findings. In only one case was there any suggestion of nerve instability, that of R. M., in which there were some evidences of tabes dorsalis. In each instance X-ray examination showed an entirely normal sella turcica and sphenoid, with the exception of R. M., whose pituitary fossa was enlarged slightly beyond the normal limit.

Any effort to ascertain the factors underlying this disease must deal largely in the field of speculation, since there is no record of any pathologic examination having been made of an eye affected with hereditary optic atrophy. The X-ray, eye-ground and visual field studies, therefore, offer the only means of arriving at a conclusion as to the primary cause. Only a relatively small number of cases of hereditary optic atrophy have been examined by the X-ray. Fisher, Pollock, and Zentmayer reported cases with some enlargement of the sella turcica. Bruner found evidence of sphenoid cell overgrowth with thin walls. The visual fields have been recorded by a number of observers, with quite constant results, the leading feature, as stated by Nettleship, being a central or paracentral scotoma with preservation of the form fields. An interesting suggestion that the pituitary gland might be responsible for the optic atrophy was made by Fisher as the result of his X-ray findings. There was no record, however, in the report that his patients showed any evidence of hyperpituitarism, and the fields gave no evidence that any portion of the optic tracts had been encroached upon by an enlarged pituitary body. It is difficult to explain the constant preservation of the form fields, which is a usual finding in this disease, if the optic nerve has been temporarily blocked in any part thru pressure from an enlarged pituitary or from sphenoid cells. In the absence of any other general or local activity of the gland, one cannot be greatly impressed with its importance as the causative factor in hereditary optic atrophy.

In the cases reported above, aside from the white nerve atrophy, the most

constant fundus picture was the evidence of a low-grade retinal degeneration, as shown by the slight pigment disturbance and the atrophic vessels. The fields conformed to those previously reported with respect to the preservation of form, but the scotomas were all paracentral or annular, instead of the usual central scotoma. In some of the cases there was entire loss of color vision, while in others vision for blue, red, and green was limited in varying degrees.

The analogy between Leber's disease in its early stages and certain toxic amblyopias has been pointed out by Cargill. He suggests that the disease should be termed hereditary central retinitis if it were proved that the primary changes were in the retina. The degeneration and atrophy under

these conditions would be ascending and not descending. Researches in neurology and certain toxic amblyopias by Birch-Hirschfeld led him to the conclusion that many cases of so-called retrobulbar neuritis had the primary lesion in the retina. A study of the eye-grounds in conjunction with the visual fields leads to the conclusion that the family herein described had suffered from a low-grade early toxemia which attacked the optic nerve and retina in particular, with consequent nutritional disturbances. There was nothing in either history or examination which indicated the source of toxic production, but it would seem likely that some type of perverted secretion, acting on inherently unstable nerve elements, was the underlying cause of the type of atrophy, as seen in the above recorded family.

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TRAUMATIC RUPTURE OF THE INTERNAL CAROTID INTO THE CAVERNOUS SINUS.

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The case here presented was peculiar in the absence of subjective noises. It seemed to be cured by ligation of the internal carotid, but some effects of the lesions still remained when the case was shown to the Eye Section of the New York Academy of Medicine, November 15, 1920.

Sunday afternoon, August 8, 1920, while running away from some cows near a camp in Carmel, N. Y., F. R., age 12, schoolgirl, fell down a bank and hit her head against a stone wall. She regained consciousness in five to ten minutes. Fearing fracture of the skull and internal injuries, she was taken at once to the Danbury Hospital, Danbury, Conn. She had no bleeding from



Fig. 1.—Traumatic exophthalmos from rupture of internal carotid into the cavernous sinus. Side view.

the nose, throat or ears; no vomiting, and no prolonged unconsciousness.

Within twenty-four hours she presented marked exophthalmos of the left eye and complete ptosis of the left eyelid; also extensive swelling and subcutaneous hemorrhage under the eye, as in a black eye, and over the left side of the face, especially in the region of the parotid gland and extending below the angle of the jaw. Except a few bruises there was no other injury, and no paralysis outside of the orbit. She complained of abdominal pain, which disappeared in a few days. While there was no further unconsciousness, she was mentally dull for a few days from the concussion. Treatment, rest in bed.

Thru the courtesy of Dr. E. A. Stratton, of Danbury, she was first seen by me on August 18. She appeared normally bright. The left eye was exophthalmic about 5 mm., with complete ptosis of the lid. Swelling of the face still persisted, as stated above. There was no redness or swelling of the upper eyelid except from the bruise, and no chemosis or dilatation of conjunctival veins or redness of the conjunctiva. The eyeball was absolutely fixed centrally, in complete ophthalmoplegia; pupil fully dilated and inactive. No inflammation of the iris. Media and fundus negative, except unusually tortuous and engorged veins. Disc outlines clear and color good. Tension with fingers was not increased; and no pulsation could be felt or seen, either of the globe or in the retinal vessels. She could easily count fingers at 12 to 15 feet. The right eye was apparently normal in every respect except that the disc was distinctly hyperemic, tho not swollen. Pulsation was visibly transmitted to the left internal jugular vein in the neck.

The first diagnosis was fracture of the base with extensive hemorrhage into the orbit. For further efforts at diagnosis and treatment she was, at my suggestion, brought to St. Luke's Hospital, New York City, on August 25th.

She presented the same picture as above stated. Vision = 15/50, and fields were good. X-ray examination was negative. The House Surgeon, Dr. B. T. Larson, then did what I should have done at the first, and with the stethoscope obtained a loud bruit thru the left eyeball and over the left temple, synchronous with the pulse and stopped by compression of the internal carotid artery in the neck. Cor-

rect diagnosis, made by Dr. Larson: "Traumatic Rupture of the Internal Carotid Artery into the Cavernous Sinus, producing an arteriovenous aneurysm."

September 2, 1920, Dr. Wesley C. Bowers tied off the internal carotid artery in the neck on the left side with a double silk tie. No untoward symptoms followed the operation and the wound healed rapidly.

The improvement was gradual, beginning with the internal rectus. 1

Left eye showed no ability to accommodate. Fields of vision in both eyes normal for green, red, blue, and white.

At the present time, November 15, 1920, she presents practically no exophthalmos, no ptosis, and improving external rotation. Both discs are now nearly normal in color. It is doubtless too soon to be able to state what the end result will be.

There have been something over 300 cases of pulsating exophthalmos reported. In 1915 Dr. A. J. Bedell¹, of Al-



Fig. 2.



Fig. 3.

Traumatic rupture of internal carotid into cavernous sinus front view. Fig. 2. Before operation. Fig. 3. After recovery.

saw her again about one week after the operation, and at that time the exophthalmos was reduced to about 2 mm. and the lower edge of the upper eyelid rested midway across the pupil. The left fundus appeared the same as before operation, except that the disc was very anemic. The right disc was still hyperemic. No bruit could be heard over the left eye, temple, or forehead, and the venous pulsation in the neck had ceased. She was discharged from the ward September 13, 1920, with ability to rotate the eye up and down, and inward, but not outward. The pupil was dilated and fixed, and she had no ability to accommodate for near objects. She did not at any time complain of, nor on direct question admit of hearing any noises in the head.

October 28, 1920, Dr. Larson found vision R=15/15; L=15/40.

Corrected: R +0.25 sph.=15/15. L +1.12 sph.=15/20; no cycloplegic used.

bany, contributed a very complete bibliography to date.

As to the diagnosis: According to de Schweinitz and Holloway² it may be impossible to differentiate between arteriovenous communication in the cavernous sinus and aneurysm of the internal carotid in the cavernous sinus, and extraorbital and intraorbital aneurysm of the ophthalmic artery. But Zentmayer³ states that the great majority of the traumatic cases are a rupture of the internal carotid artery into the cavernous sinus, producing an arteriovenous aneurysm in the cavernous sinus.

In this case there was comparatively little venous stasis, as shown by the lack of redness or swelling of lids and conjunctiva; and the absence of dilatation of the nasofrontalis and angular veins at the inner angle of the orbit. De Schweinitz and Holloway (p. 45) state that the venous masses at the in-

ner angle of the orbit do not develop until several weeks after the rupture of the artery; and as this case was operated upon, in less than four weeks after the accident, it may be that the venous masses would have appeared later if the operation had not been done so soon.

Again referring to de Schweinitz and Holloway, p. 37, it appears that the persisting paralysis of the sixth nerve may be due to its laceration where it grooves the body of the sphenoid (in cases of fracture of the base); or, in other cases, to its proximity to the internal carotid artery in the cavernous sinus.

In this case, which after admission to St. Luke's Hospital was examined by other men besides myself, no pulsation was seen in the fundus, or of the globe, and no pulsation was felt when the eyeball was pushed back into the orbit. Pulsation was transmitted to the internal jugular vein in the neck. Dr. Homer Smith has suggested that probably the pulsation of the globe was present, but that a sufficiently delicate method was not used to observe it. He stated that if a piece of thin paper were placed on the exophthalmic eye, the paper could be seen to rise and fall with the pulsation. This test was not made. De Schweinitz and Holloway, p. 19, state that 90% of these cases pulsate—i. e., 10% do not pulsate.

Dr. Alfred Wiener suggests that in those cases in which the inferior and superior petrosal sinuses—into which the cavernous sinus empties—are proportionately larger than the ophthalmic vein, the pulsation might be transmitted downward to the internal jugular vein in the neck instead of outward into the orbit to the globe.

The circular sinus passes around the pituitary body and connects the right and left cavernous sinuses. Hence the hyperemia of the right disc was doubtless due to pressure transmitted from left to right cavernous sinus via the circular sinus, without enough involvement of the right cavernous sinus to make the venous stasis and exophthalmos bilateral.

FEATURES OF SPECIAL INTEREST

1. Entire absence of subjective symptoms of noises in the head.
2. Absence of dilation of conjunctival veins and of the naso-frontalis and angular veins at the internal angle of the orbit.
3. Complete ophthalmoplegia.
4. Pulsation transmitted to the internal jugular vein of the neck in the same side instead of to the eyeball.
5. Recovery, with retention of excellent vision (to date), after ligation of the internal carotid artery on the same side.

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SUBNORMAL ACCOMMODATION; THE RESULT OF FOCAL INFECTION.

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In the three cases here reported subnormal accommodation was associated with focal infection in the tonsils. Removal of the tonsils in one case was followed by rapid recovery.

Some years ago I had at about the same time three patients with subnormal accommodation. All of these had nasty, infected tonsils, which would get inflamed on the slightest provocation. As these people were perfectly all right every other way, I felt sure that the tonsillar infection was the probable cause of the lack of normal accommodation; but as none of them would have his tonsils removed I could not determine this to my satisfaction. To the most promising one I offered to remove the tonsils without any charge, but without avail. And just at this time some physician published in *The American Medical Journal* an article on focal infections and their relationship to diseases of the eye; and in it was cited a case of a boy whose accommodation was practically abolished, which promptly returned to normal after the removal of diseased tonsils. I read this article to my proposed victim, but it did not interest him enough to have his tonsils removed; so I had to put the idea in the background, awaiting for a suitable occasion to demonstrate to my own satisfaction the relationship between lack of accommodation and infection from chronically diseased tonsils.

In the last two years I have had three other cases of this character, so I should judge that they are not common. Of this group I was able to persuade one to have his tonsils removed; and while he lost his tonsils he got back his accommodative power and I got the data that I had been waiting for these years.

Case I. Mrs. B., age 32. Could not read even for a short period without blurring and exhaustion. Had worn glasses for some time. Subject to sore throats, and had quinsy three or four times. Examination revealed large red tonsils, with enlarged crypts filled with plugs; foul secretion exuded on

pressure. She was refracted under drops, and with the correction the near point for both eyes was 8 inches = age 37. After three weeks the near point was 10-11 inches = age 42. We had to add plus one sphere to the static refraction to enable her to read with comfort. About one year ago examination revealed the near point at 9 inches, with this correction.

Case II. Mrs. A., age 37. Complains she cannot see to sew, and eyes blur. Wears glasses constantly. Distance correction given under drops, but had to add plus one sphere to this to enable her to sew with comfort. The near point with this addition was then 10 inches = 41 years of age, with a presbyopic correction for the average person of 45 years of age. Examination here revealed badly diseased tonsils, with pus in the crypts.

Case III. Mr. P., age 24. Complains of headaches; gets drowsy in the afternoons, and when he tries to read in the evenings he usually falls asleep—the typical history of a presbyope. Has been wearing glasses fitted by an oculist for a year; but these have not helped him at all. After the drops had worn away and with the correction the near point was 6 inches = age 31: one week later the near point was 8 to 8½ inches = age 38.

History revealed he has been subject to colds, which usually settled in his throat. The examination revealed large, chronically inflamed tonsils and a large adenoid. About three weeks after I gave him his glasses he had an attack of tonsillitis; and when this had subsided he had the tonsils and adenoids removed under local anesthesia by Dr. McNaught, who also remarked on their diseased condition. Three weeks after the removal of the tonsils the near point had advanced to 5½ to 6 inches; and two weeks later than this the p.p. was 4 to 4½ inches, the av-

erage range for a man of his age. He reported that he felt fine and was able to use his eyes with perfect comfort and with none of the distressing symptoms that he had previously experienced. In this case it is quite interesting to note that the converging power is 40 degrees plus, showing that the unusual effort expended to get accommodation had stimulated the twin function of convergence.

After the use of homatropin some eyes are slow to regain their normal tone. The use of pilocarpin at night for a week is very useful here; but if there is any complaint for a longer period than this the cause is apt to be reduction of the accommodative power of the sphincter.

Whenever one encounters a case of subnormal accommodation it is well to bear in mind, however, that there is another cause for this symptom. Neurasthenics are frequently troubled this way; but their complaint is usually quite different from the tonsillar type. They report that their eyes are tired and ache in the mornings and that it is quite an effort to use them at first, but as the day wears on they get limbered up and this discomfort passes away; and after dinner they usually feel quite fit. These are the people "who hate to get up in the morning and to go to bed at night."

On the contrary, the infectious type have a history similar to presbyopia,—the eyes begin to tire as the day proceeds; they get drowsy in the afternoon and are apt to go to sleep trying to read at night. These facts are quite interesting, for if the accommodation of the first type were examined late in the afternoon it might appear normal; while in the latter, an examination early in the day would give an incorrect idea of the accommodative power. Just as the patient who has reached the presbyopic age, it is often necessary to measure the accommodation after the eyes have been used all day, to get the right estimate of the cause of the eye discomforts.

The preceding paragraph has just been read to a student in the University. He is a neurasthenic and he stated that the description of that type

fitted his case exactly. Mr. M., age 19, has been wearing glasses for 18 months, but has frequent headaches. The near point with his old correction (which was fitted by another man) is $6\frac{1}{2}$ inches = age 33. His tonsils have been removed, but there is still a large piece remaining in the right apex; and this piece is inflamed and red. This may have some influence on his accommodation; but in addition to this he is of the neurotic type. With the new correction, determined under drops, his near point is $5\frac{1}{2}$ inches, the range of a man of 29.

Focal infections from the teeth and nasal sinuses have not in my experience caused weakness of accommodation. Infected teeth have usually caused a spasm and where excessive spasm exists, under drops, I inquire into the condition of the teeth. Chronic inflammation of the nose may cause an upset of the nervous equilibrium, and thus indirectly be responsible for such cases.

Of course any general disease sufficient to cause intoxication of the whole muscular system would naturally affect the ocular sphincters, as a part of that system; and it is more than probable that in cases of infection from tonsils observations on the behavior of the general muscular system would also show evidences of weakness.

This paper has been presented simply to emphasize the fact that there are cases of eye distress the direct result of insufficient accommodative power; and in these cases of discomfort after the eyes have been carefully refracted it would be well to investigate the accommodation and if that be impaired then look farther for the cause of it.

Civilization demands greater use for the eyes, both in business and in pleasure; and therefore a function that is so constantly used must needs be carefully guarded and preserved. And every examination of the eyes should include an investigation of the range of the accommodation.

The question of glaucoma, of which diminution in the power of accommodation is a prominent symptom, has not been considered here; the cases cited having no symptoms of that disease.

CLINICAL REMARKS UPON SOME VARIETIES OF GLAUCOMA, ESPECIALLY WITH REFERENCE TO PROGNOSIS AND TREATMENT.

G. HERBERT BURNHAM, M.D., F.R.C.S.

TORONTO, CANADA.

Various forms of primary glaucoma are here discussed and illustrated by cases.

The varieties of glaucoma to be dealt with do not include those secondary to cases of cycloiritis with copious exudation, and to wounds.

My mode of procedure will be to draw upon cases, demonstrating the different varieties, to give the treatment followed out with the rules guiding it, and then finally to give the prognosis with my reasons.

I am venturing to write what I have been observing for many years regarding this disease, glaucoma. This disease is due primarily to a pathologic condition of the ciliary processes, and certain variations of this condition are accountable for the varieties of glaucoma, and these, carefully studied, enable one intelligently to plan the treatment, and to give a fairly accurate prognosis.

To find out the reason why disease of the ciliary processes is associated with pathologic changes so different in their manifestations and effects, opens up a fertile field of research work, as we at present, in very many cases, have only ill-digested suppositions to assist us.

Some forms of acute glaucoma respond quickly and permanently to an iridectomy, with which may, or may not, be combined Priestley Smith's operation. Again, what is apparently the same condition does not do so well, and after the operation there occur relapses of pain, and congestion and perhaps plus tension. When this happens it means that there has been in addition to much congestion and swelling of the ciliary processes, which alone were present in the cases of the first variety, an actual inflammation of the ciliary processes. Now if the second variety, that of inflammation be treated, in addition to the iridectomy, with mercury and the iodid of soda, and

perhaps atropin to see if the pupil be bound down in any way, a good and permanent recovery will result.

Again in another form in which dimness of vision, as 6/9, 6/12, or less, and the optic disc not cupped, T. full, pupil a little dilated, and tho active does not contract fully, fairly good or shallow A. C., we have to deal with a slow cyclitis, unassociated with pain. In some of these cases, if eserin gr. $\frac{1}{8}$ be used, there is only a slight uneasiness of the eye, which quickly passes away. In others, apparently similar, this same strength of eserin may give rise to most severe eye-pain, and also even acute vomiting after every application.

This means that the greater the severity of these symptoms, the more extensive is the disease of the ciliary processes. So in these cases tho the T. is plus, I have found it wiser to use eserin gr. $\frac{1}{16}$, and mercury and the iodid to begin with. I use tablets of Hyd. c. Cret, et Doveri of the strength of hyd. c. cret. gr. 1 to a tablet, 3 d.s. $\frac{1}{2}$ an hour after eating, and sodii iodidi gr. X. with sodii bromidi gr. V. 3 d.s. one hour after eating.

As soon as the eye bears eserin gr. $\frac{1}{8}$ with very little reaction, if the T. is plus, tho the vision is improving, I advise an iridectomy. If, however, the T. is undoubtedly approaching normal and the vision is improving, I refrain from an operation.

The keratome is entered well back in the sclera, for in this way a well filtering scar is made. I get as good a result as with trephining, unassociated with its drawbacks, for the sclera is, and remains healthy.

After the operation I continue for some time the local and internal treatment. The length of time of continuance of the treatment varies from 3, 6,

9 months or longer, according to the severity of the diseased condition; for this type of affection of the ciliary processes has sometimes been of long duration before coming under the notice of the oculist.

I may also add that in people of 60 years or older, sometimes vision cannot be made to exceed 6/9 and a few letters of 6/6, tho no apparent reason can be found, as media are clear and tension normal. These are sometimes incipient cases of glaucoma, as evidenced by subsequent glaucoma, perhaps several years afterwards. Eserin is used with benefit, taking away an uneasy feeling often complained of and improving vision.

However, if an operation has been advised to be done at once and not agreed to, then if subsequently performed, it may be better in some cases to make an Elliot's trephining, so as to be sure of a filtering scar. If, however, an iridectomy be done, I should advise, first making a conjunctival flap, and then the scar is more likely to be a well filtering one. In fact I think that all iridectomies for glaucoma should be executed in this way, as being more in keeping with our beliefs.

The prognosis in all the varieties of this form of glaucoma is good, even in those in which the use of eserin causes such violent reaction.

Now in cases in which there are decided cupping of the optic disc, T. plus, good a.c., p. a little dilated and feebly active; in fact in this form the iris seems sometimes to hang as an almost lifeless curtain, even atrophic looking; thus showing the long standing diseased condition of the ciliary processes, we have to deal with the most serious form of glaucoma.

Eserin may be fully used and no disturbance of the eye, sometimes with an improvement of vision, but still T. plus. In this form an iridectomy does not keep the tension normal, i. e. T. plus soon returns save in exceptional cases. Therefore I have preferred Elliot's trephining operation, using Beardsley's sclerectome.¹

The filtering scar of an iridectomy does not keep open as in the form pre-

viously mentioned, as it is small, and soon closes on account of the sclera not being healthy.

After the operation, tho tension remains normal, the vision slowly deteriorates. If the condition of the sclera shows disease, it is a sure sign that it will get worse.

In one illustrative case that I have in view, when first seen by me the disease had been present for several years. R.V. — 6/9. L.V. — 6/24 two letters of, and all the accompanying conditions of chronic glaucoma, each T. plus, decided.

I advised an operation but my patient refused as her husband was very ill. The course of treatment I had sketched was at once to trephine, use eserin locally, and "The Combined Treatment."²

However, I had now to use C.T. alone. At the end of six months E.V. — the same. Optic disc more vascular and each T. full.

At this time she learned that her husband had cancer of the bladder. Consequently I could only give C.T. very irregularly during these last eight months of 1914, a most serious handicap.

At the end of 1914 the condition R.T. full. V. with glasses 6/12 and 6/9 two letters. L.T. full. V. with glasses 6/24. She still refused an operation.

In the spring of 1915 she came again to see me, now R. eye V. with glasses 6/36. L. eye V. with glasses 6/60 —. Each T. plus 1.

She now agreed to an operation. I found a condition of the sclera present which was not expected. The left eye was first operated upon and the operation was easily done, the sclera being firm and apparently healthy. The right eye was operated upon with much less ease, and this was altogether due to the condition of the sclera. This latter gave a doughy feeling to the knife, quite a contrast to the firmness of the left sclera. The knife penetrated the sclera with difficulty. The incision was enlarged with the edges of the keratome of the sclerectome slowly, as it gave to the pressure of the knife, in-

stead of cutting quickly. The operation was quite successful.

At the end of one year, tho Tn., the vision of R. eye remained 6/36. Left eye V. — 6/36.

At the end of the second year, R.V. — 6/60 and gradually failing. L.V. — 6/18, and then began to lose ground.

Now in 1920, the condition of R. eye was T; p.l. only. L. eye Tn., V. — 6/60, so she could guide herself about the house and attend to her household duties.

I have frequently heard the dullness of the knife remarked upon in doing an iridectomy in cases of this form of glaucoma; but subsequent experiences have made me think that the unrealized diseased condition of the sclera was often doubtless the cause.

Sometimes the diseased condition of the sclera can be, if not diagnosed, at least strongly suspected, if the finger tips used in estimating the T. be sensitive and educated. The T. plus of the left eye was certainly always more elastic than the T. plus of the right eye. The relative conditions of the sclera, as shown by the operation, made me realize that the difference in the feeling of the eyes thru my finger tips, which otherwise I should not have thought of any importance, meant a great deal, and was of distinctive value as to prognosis. The diseased condition of the sclera of the right eye, evidently more rapid in its progress than that of the left, appears to account for the earlier loss of sight of the right eye, as this eye, when the patient first consulted me, had much the better vision and was apparently the less diseased. Hence the condition of the

sclera should be as carefully gauged as possible in every case.

In cases where there is no cupping of optic disc, as we have to deal with a cyclitis, unassociated with a tissue change of the optic nerve and sclera of any moment, the prognosis is good, unless in some extreme or neglected cases, if the treatment I have advocated is strictly adhered to.

But in cases with cupping of the optic disc, the prognosis as to ultimate recovery is always unfavorable, owing to the extent of the tissue change. When the sclera is already involved, blindness is not so far away.

However, when this form is seen early, i. e. before tissue change is so extensive, a favorable prognosis can be given, if the following conditions be carefully carried out, viz.: that a trephine operation be done, and that internally mercury and the iodid be steadily used for a long time, i. e. 6 months, 1 year, or longer, or still better, the "Combined Treatment." That the eyes be kept under the influence of eserine is not now necessary, unless in exceptional cases.

Normal tension can only be brought about and maintained by the trephine operation. But this is only one factor in the treatment. The medical part, local and internal, is in its way very important. It seems to me that only by the union of the operative and medical forms of treatment can one be said to have used full measures in endeavoring to bring about a successful issue.

I have neglected to mention that in all of my cases of glaucoma I have at suitable stages taught my patients persistently to use a gentle massage of the eyeball thru the upper eyelid.

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NOTES, CASES AND INSTRUMENTS

A NEW RETINOSCOPE.

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As his accommodation fails it becomes increasingly difficult for the ophthalmologist to note exactly the point



Fig. 1.—a, Mirror obtained by silvering surface of concave lens. b, Concave mirror by silvering convex surface of plano-convex lens. c, A combination of b with plane mirror; giving effect of convex lens at sight hole.

of reversal when using the retinoscope. Particularly is this true when working at a shorter distance than one meter, as is sometimes necessary when the

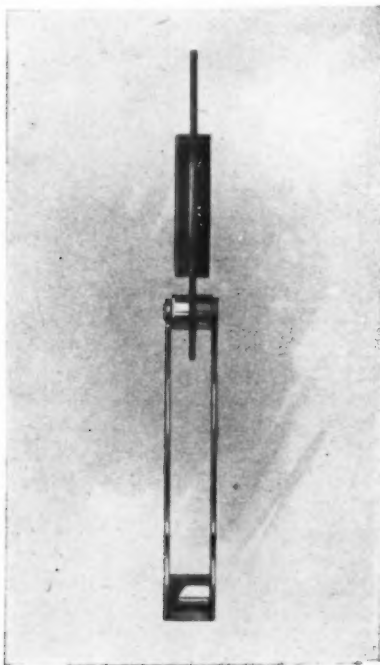


Fig. 2.—Bennett's retinoscope showing two mirrors placed back to back.

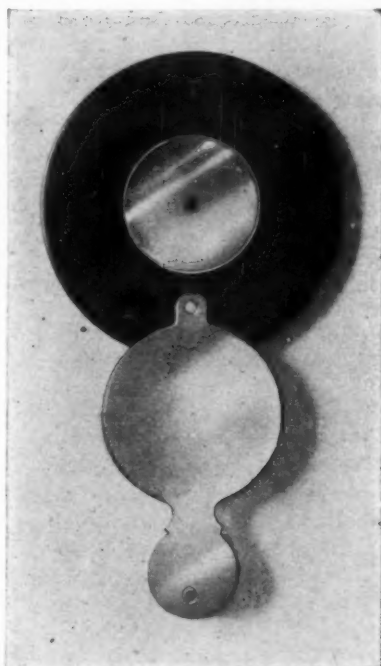


Fig. 3.—Retinoscope, front view open.

"scissor motion" is present. To overcome this difficulty I have devised a retinoscope with a small $+1.00$ lens behind the sight-hole, which I have



Fig. 4.—Retinoscope closed to carry in pocket.

used with great satisfaction for some time. Even to one accustomed to the flat mirror, occasionally the concave mirror is preferable, particularly in cases of high myopia, so an attempt was made to combine the two in one instrument.

As usually constructed, the concave mirror is exactly what the term denotes, a planoconcave lens, with the reflecting amalgam on the flat surface as shown in Fig. 1a. So that if a flat mirror and a concave mirror be mounted back to back, with the amalgam removed at corresponding points for a sight hole, one would get the effect of a minus lens, thereby increasing the trouble of the presbyopic examiner, or if a hole were drilled thru both lenses, no assistance.

In the retinoscope to be described, I have taken advantage of the fact that a plus spherical plano lens with the reflecting amalgam on the convex surface, becomes in effect a concave mirror as in Fig. 1b; and at the same time is a + lens and can be combined with a flat mirror, so as to overcome the examiner's presbyopia. In this instrument, the concave mirror is a + 1.00 sph.-plano lens, mounted back to back against a flat one, Fig. 1c, the amalgam is removed at corresponding points, so that the effect of + 1.00 sph. is available for either side. After working with it for some time, I find it very satisfactory, enabling me to observe slight movements much more accurately than thru the simple perforation. I beg to commend it to my colleagues who are, like myself, no longer in the first blush of manhood.

The Buffalo Optical Co. of this city carried out my idea in a very admirable manner, and I wish to express my appreciation of their efforts.

FIXATION OF THE EYEBALL PERPENDICULAR TO THE SECTION.

DR. ALFRED PERLMANN,
ISERLOHN, GERMANY.

Translated by H. W. Aufmwasser.

The difficulties experienced in making a smooth cataract section can be

overcome if one succeeds in fixing the eye perfectly, without exerting pressure on it. If this is attained the eyeball will not recede before the knife and will not turn around its axis. Then one can make the incision easily, and guide the knife with surety thru the anterior chamber without injuring the iris or causing premature loss of aqueous humor and falling of the iris upon the knife. Finally one can locate the counterpuncture at leisure, and complete the incision at one or two strokes of the knife and form a conjunctival flap. The problem is: how is a perfect fixation of the eyeball possible without injury to it?

None of the numerous methods so far introduced answered this purpose. The one arm fixation forceps which are mostly used, straight or curved, only fix the eyeball at one point, about which it rotates with the manipulations of the knife.

The double arm fixation forceps which have been used heretofore must be placed parallel to the section, and require therefore a forced manipulation of the hand, which readily causes a pressure or pulling on the eyeball. In spite of various recommendations, their use has almost been discontinued, and one finds in the text books illustrations with one arm forceps.

The different varieties of Pamard's spears have not been used to any great extent, as they were inadequate. Then there are many other procedures, which were temporary imitations, that never came into general use. Other operators transfix the eyeball with a ligature. This procedure prolongs the operation, causes wounds of the conjunctiva, which, thru hemorrhagic infiltration, can disturb the further operative action, places the conjunctiva in annoying folds and adds to the discomfort of the patient.

The application of several one arm forceps or a combination of forceps or ligature, requires assistants whose hands are in the operative field and hinder the operator in his manipulations. An assistant who must perform much work must be perfectly trained; which becomes necessary at each

change of the personnel, and even the most careful and able assistant cannot prevent that an eye may become endangered, and even exposed to loss.

If until now the one arm forceps have been generally preferred, in spite of all their shortcomings, instead of other fixation methods, the reason for this is probably due to the fact that they can be so easily handled, disturb the eyeball the least, and enable the operator to dispense with assistants.

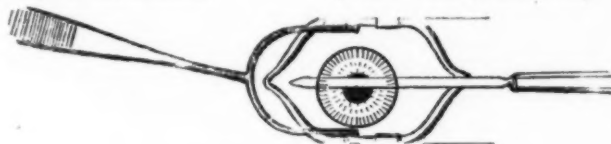


Fig. 1.—Perlmann's double fixation forceps.

Two years ago I published a new method* with the help of a fork-forceps, which is just as simple as the method with the one arm forceps. By fixing the eyeball vertical to the section, I removed all the drawbacks of the old methods, without adding new ones. I employ double arm forceps provided with suitable markings, which by a bend in the handle permits the knife to pass beneath it. The illustration shows its application. The instrument can be attached and detached like the one arm forceps; but obviates all other of the above mentioned disadvantages.

The slightly opened (spread) instrument is placed vertically in the vertical meridian upon the eye and close to the limbus. Then there is above a space of 3 mm. for the formation of a conjunctival flap. To put the forceps in place with wide open prongs is not recommended, because it would produce disturbing folds of the conjunctiva. Now close the prongs of the forceps and place the same toward the nose so that the operative field is free, then you have the eyeball tightly fixed and in control. The eyeball can be easily pulled forward and in this manner one decreases the pressure upon the eyeball and holds it firmly against the knife, so that in making the section the whole of the cutting power of the knife is used. In one or two strokes the

scleral incision is made and one can form now a higher or lower conjunctival flap as may be desired. A catch (lock) on the forceps is entirely superfluous. I never employ forceps with locks, as I am of the opinion that a fixation forceps should be so that it can be removed without delay, instantly.

The method of fixation as mentioned above I have now used for eleven years or more, and it has proved to be of great value, not only in cataract sec-

tion but also in all other conditions which require fixation. I have never had cause for improving this method, as it fulfills indeed the purpose mentioned in this communication, to put the eyeball in absolute control of the operator without endangering the eyeball or without prolonging or complicating the operation.

Since I have published my method two years ago, I have been asked from different sources both at home and abroad about the source of supply of the forceps and later I received to my great pleasure a number of agreeing, even enthusiastic, notices. Today the method is used in a large number of eye clinics, among them many university clinics. The object of this communication is to bring it to the notice of my colleagues in America.

TRAUMATIC MYOPIA.

JOHN H. BAILEY, M.D.,

BROOKLYN, N. Y.

The report of the two following cases of temporary myopia of traumatic origin may be of interest.

Case 1. P. C., aged 26, machinist. In turning a block of wiring, a piece of wire snapped and struck him in the left eye. The injuries were as follows: several ecchymoses in the left upper lid, perforation of the skin near the center of the inferior orbital margin, laceration of the temporal aspect of the ocu-

*Klinische Monatsblätter für Augenheilkunde, 1919, vol. LXII, page 488.

lar conjunctiva and involving also the subjacent episclera, and an inverted Y-shaped opacity of the cornea deeply situated, probably in Descemet's membrane. The tension was somewhat lower than in the fellow eye; $V=20/200$. Between the optic nerve head and the macula, the ophthalmoscope revealed an edematous area of irregular contour and about 2 disc diameters in extent. The diagnosis was, obviously, commotio retinae.

The lacerated conjunctiva was sutured, atropin instilled, and the case managed in the routine way. Recovery was rapid and complete; the corneal opacity cleared up and the commotio retinae disappeared. On the fourth day of the injury the eye was retinoscoped and found to be myopic, with -2.50 S. $V=20/30$. The patient insisted that prior to the accident, vision in that eye was as good as in the uninjured eye. The next day the patient took in addition a $-.50$ cyl. axis 180° . This refractive state continued two days longer, when the eye measured emmetropic, and vision equaled $20/15$ and no glass would be accepted.

The question arises what caused this temporary myopia? Various possibilities suggest themselves. Was the myopia due to increased corneal curvature consequent upon the injury to Descemet's membrane? Did any alteration take place in the composition of the aqueous humor augmenting its refractive index? The myopia could not be attributed to irritation of the ciliary muscle, for the eye was fully atropinized. Was the myopia axial because a weakened sclera could no longer afford adequate resistance to the pressure of the intraocular fluids? The commotio retinae, per se, could hardly account for it; if anything, it would reduce the antero-posterior diameter of the eyeball. Was there a relaxation of the suspensory ligament of the lens which gave a greater curve to the ventral surface of the lens? One might speculate in several other directions without coming to any definite conclusion.

Case 2. D. R., 20 years old, automobile mechanic. While repairing a car,

something fell into his left eye. There were the usual symptoms accompanying the presence of a foreign body in the cornea. The patient received no medical attention for several days. Then, on account of the extreme discomfort, he went to a general hospital, where unsuccessful attempts were made to remove the foreign body. He was then referred to an eye hospital, where the house surgeon was equally unsuccessful in his efforts, and the patient was requested to return the following morning for a magnet extraction. I saw the patient the evening of the same day.

Examination revealed a piece of metal protruding slightly into the anterior chamber above and temporally and just within the limbus, the wound of entrance being invisible and apparently occluded. An electromagnet was applied over the site of the foreign body without effect. A small corneal incision was made, and with the tip of the magnet a piece of steel about 2 mm. long and 0.2 mm. wide was readily recovered. The visual acuity of the eye was not impaired, the patient reading $20/20$ with ease. Atropin was instilled, the eye dressed, etc. For the next two days progress was uninterrupted. On the third day the patient, while straining at stool, felt a sudden gush of warm fluid in the injured eye. He now complained of excessive lacrimation, and of markedly disturbed vision.

Upon investigation, the anterior chamber was found to be obliterated, the iris in contact with the posterior surface of the cornea, and vision $20/200$. There was no doubt that a rupture of the cornea had occurred with escape of the aqueous. The media were perfectly clear, the fundus negative. Retinoscopy demonstrated a myopia of 8 diopters. The following day the anterior chamber had become reestablished, the refraction was emmetropic, and vision normal.

The transient myopia may be explained thus: following the escape of the aqueous, the crystalline lens assumed a more anterior position which resulted in a proportional shifting forward of the focal points of the dioptric system of the eye.

NEUORETINITIS FOLLOWING SALVARSAN INJECTION.

POPE W. ODEN, M.D.

WILLIAM BEVERLY WHITE, M.D.

SHREVEPORT, LA.

In a survey of the literature there are cases reported of neuroretinitis following the injection of arsphenamin. Nevertheless, some American authorities claim that we do not have serious optic nerve diseases following the administration of salvarsan. Würdemann¹, for instance, in a most excellent paper, states that neuroretinitis appearing in syphilitic conditions following administration of salvarsan is due to the spirochete toxin and not the drug, theorizing that arsenic causes a liberation of spirochete toxins, which in turn is the direct cause of the neuroretinitis.

Cohn² has demonstrated that an idiosyncrasy for arsenic does exist, and this would seem to be substantiated by a case reported by him, in which a retrobulbar condition developed following the administration of eight minims of Fowler's solution in 24 hours. Zeiss³, also Mukai⁴, report cases in which neuroretinitis followed the administration of salvarsan. Quoting de Hass⁵ result of examination of 8,000 patients, he was able to make the clinical diagnosis of neuroretinitis arsenicalis in 56 cases, and in 53 of these arsenic was present in the urine.

De Hass statistics relate to the artisan employed in various arts in which arsenic is used, showing conclusively the relationship between arsenic and optic nerve disease.

CASE.

History: Mr. B., age 24, single, usual diseases of childhood. When discharged from army vision was normal. Developed syphilitic lesion during latter part of July, 1920, immediately consulted his family physician. Treatment was instituted during the next week, when he received his first injection of salvarsan. As further treatment, he was given an injection of salvarsan once a week for the following four weeks. He suffered but little nausea and there was nothing to indicate a contraindication of the drug. The morning following the fifth injection

he noticed a blurred sensation relative to his right eye, and consulted his family physician, who in turn referred him to us.

Examination: Pupil responds to light, accommodation, Fundus: Disc markedly swollen (4 D.), cloudiness of surrounding retina, arteries small, veins large and very tortuous. Floating opacities in vitreous. Vision: 20/200. Central scotoma for red and green.

L. vision 20/20. Fundus apparently normal, sinuses negative, Wassermann negative.

The pertinent factors of this case which we wish to emphasize are:

First. Less than four weeks after exposure, or to be more exact, during the first week of the appearance of the initial lesion, this patient received his first injection of arsphenamin.

Second. The marked elevation of the papilla. Edema of the surrounding tissues; central scotoma for red and green; vision 20/200. This condition developing 12 hours after the fifth injection of arsphenamin.

In conclusion, wish to state that when seen during latter part of December, 1920, Wassermann was negative, and there was no change in the above mentioned eye condition.

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CORNEAL AND SCLERAL MEASUREMENTS OF INTRAOCULAR TENSION WITH BROWN TONOMETER

EDWARD J. BROWN, M. D.

MINNEAPOLIS.

A suggestion of Dr. C. W. Hawley led to the following work.

If palpation of the eye with the fingers has any value the measurement of the intraocular tension with a tonometer applied to the same part of the eye but inside the lids ought to have a more definite value. I therefore adopted the routine practice of applying the tonometer in every case, first over the sclera and later on the cornea. For the first few scleral measure-

ments I had the patients look in such direction that the instrument might be applied just outside the limbus and between the superior and external recti. I soon found that it was simpler and easier to have the patient look directly forward and apply the tonometer between the limbus and the superior rectus insertion.

I believe these scleral measurements have distinct value. First, they reassure the patient that the operation is painless and harmless. Second, they can be used in the case of nervous children and women who cannot be controlled sufficiently to get satisfactory corneal readings. I have made sixty-six such comparative measurements, as shown in the following table. The scale of my instrument being based on mercurial manometer, I have subtracted ten from the readings to make them approximate the Schiötz standard.

No.	Cornea.	Sclera.
1	35-35	42-42
2	35-30	40-40
3	29-33	40-40
4	30-30	50-50
5	30-34	45-40
6	28-33	45-55
7	30-28	40-40
8	28-25	32-32
9	25-25	40-38
10	26-38	40-50
11	28-28	38-38
12	22-22	25-25
13	22-26	20-23
14	25-25	30-45
15	28-31	40-45
16	26-24	35-40
17	32-38	40-40
18	32-34	40-40
19	32-30	40-40
20	31-30	50-50
21	40-30	60-45
22	40-33	45-60
23	26-36	45-50
24	40-26	55-40
25	40-45	55-55
26	34-26	45-52
27	36-36	40-40
28	25-26	34-40
29	26-28	40-40
30	each 30	to 35 40-40
31	30-30	38-38
32	28-38	35-45
33	38-25	50-45

34	28-28	43-48
35	26-30	40-50
36	30-40	27-45
37	38-37	45-50
38	25-26	40-35
39	25-40	30-50
40	28-25	40-40
41	33-33	55-55
42	25-22	25-40
43	32-38	32-50
44	32-34	50-50
45	32-30	40-38
46	25-23	32-32
47	35-22	45-45
48	33-34	50-50
49	30-30	38-50
50	28-28	38-39
51	25-28	38-40
52	26-29	31-45
53	32-35	30-42
54	35-35	45-47
55	25-25	30-35
56	32-37	45-48
57	26-28	45-45
58	22-26	32-35
59	30-33	50-50
60	35-22	42-35
61	18-33	33-55
62	35-35	47-47
63	35-	30-
64	35-35	40-40
65	32-32	45-45
66	35-38	32-42

REMARKS: No. 7. R. fingers at 12 inches, L. with compound myopic correction 20/30. Right anterior chamber practically nil, both fields about 15 degrees.

No. 25. Chronic glaucoma, L. blind for years.

No. 30 and 46. Child aged 8 years, tension reduced by ten days' use of scopolamin.

No. 18 and 58. Boy aged 10. Pain of eyes and head, temporal cups of both discs and in L. vessels undermined. Five days after use of scopolamin pupils 5 mm. and tension plus, great relief and lowering of tension from use of eserine 1/1000.

No. 61. Male, 56. Blind ten years. Right, hypermature cataract; L. posterior staphyloma. V. — 20/40 with — 9.50 — 2.50 cyl. axis 165°. Has had no treatment for three years.

The average of 130 comparative measurements gives about 11 mm excess to sclera above corneal tension.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly the important scientific papers and discussions.

ROYAL SOCIETY OF MEDICINE. SECTION OF OPHTHAL- MOLOGY.

Meeting of January 14.

DR. JAMES TAYLOR, President.

Steel Retained in the Eye.

MR. G. WINFIELD ROLL showed a man who had a fragment of steel embedded in his eye for 18 years. Soon after the particle entered the eye, a skiagram located it in a direction up and out. The man said he was blinded for a week immediately afterwards, but the trouble then passed off, and he had not had any eye difficulty since. When seen a few weeks after the accident vision was 6/6, and the media were clear. A tiny nebulous spot was now to be seen in the neighborhood of the limbus.

Mr. Roll did not consider it a case calling for interference, as the vision was good, the eye was quiet, and a good time had elapsed since the accident. Latterly, however, vision had gone down to 6/18. The only change in the ophthalmoscopic appearances after all this time was the development of an area of atrophy below the foreign body, with a slight deposition of pigment at the same site. There were also a few vessels, which were either remnants of the choroid vessels, or were collaterals. He mentioned a case from the AMERICAN JOURNAL OF OPHTHALMOLOGY, in which a foreign body had remained in an eye 29 years; and said he did not see why there should be any limit to such residence provided the body was aseptic and was not causing trouble.

DISCUSSION.—Mr. W. T. Holmes Spicer thought the changes in the neighborhood of the choroid were due to the presence of the foreign body. Siderosis sometimes followed from such bodies in the eye, and in this case there was probably a local siderosis. One man under his care had a piece of

metal in his eye three years before any siderosis developed, and then the eye turned a rust color.

Cupping of Disc Without Glaucoma.

MR. A. HUGH THOMPSON showed a case in which there were discs with large intermarginal cups, without, as yet, any symptoms of glaucoma. The tension was normal. Sometimes the eyes were misty, but the patient, a woman aged 52, never saw rainbow colors, and no lens opacity could be made out. He considered that this case was on the way to the development of glaucoma: it was now at a stage when various opinions would be sure to be expressed.

Coloboma of Macula.

MR. MALCOLM HEPBURN showed a case of coloboma in the macular region. It was difficult to justify that term, but if ever there was such a case, surely this was one. It had a pearly white center with a definite ectasia on the temporal side of the patch. He considered the condition to be very rare.

Demonstration of Instruments.

PROFESSOR SALOMONSEN, of Amsterdam, demonstrated an ingenious set of instruments for photographing and demonstrating to students the interior of the eye.

MR. HUDSON showed a new form of *perimeter*, and Dr. RAYNER BATTEN demonstrated, by means of rubber balloons, what he termed *deep tension*, which, he argued, had its analogue in the eye, and when present in that organ indicated the imminence of glaucoma. It was elicited and measured by dimpling under a definite pressure.

Physiologic Cup and Glaucoma.

DR. RANSOM PICKARD, of Exeter, read a paper entitled: "Variations in the Size of the Physiological Cup and Their Relations to Glaucoma." The cases reviewed in this paper were a consecutive series, eliminating only cases of actual glaucoma and other diseases affecting the disc. The objec-

tion might well be raised that the patients came because they had some affection of the eyes, and that they were not simply a part of the general population; still, the total numbers dealt with in the later age-groups corresponded very closely with the general population age-groups in the county (Devon). Glaucoma was so rare under forty years of age that cases might be taken, from this standpoint, as normal.

The older the patient, the greater the assumption that pathologic changes had occurred, glaucoma accounting for a large proportion of these. Where necessary, the tonometer for pressure, and the screen for the field of vision were employed. The shape and size of the disc and the cup were carefully drawn in each case, and transferred, by means of carbon, to graph paper. The area of each disc was then measured, and the results were reduced to a percentage, 100 being taken as the total area of the disc. The cases were grouped in ten-year periods. The myopic cases had large cups, tho there were only two groups (16-25 and 26-35 years) in which the largest myopic cup was not exceeded by a hyperopic cup.

Explanation of the alterations in normal disc cups involved, he said, many difficulties. An alteration in the size of a cavity, situated in a solid like the sclerotic and filled with a viscous fluid, might conceivably occur under three conditions: (1) no alteration in pressure; (2) tension from without, as in the contraction or disappearance of nerve fibers or fibrous tissue. In the present series cases of this kind were excluded. (3) There might be pressure from within, i. e., pressure exerted by the vitreous, as in glaucoma. He submitted a two-fold suggestion: that the tissues of all discs were not equally strong, and that small increases of pressure acting on the weaker discs over long periods might cause an enlargement of the cups in those cases, but not to the extent of interfering with vision.

Dr. Pickard went on to show, by means of the epidiascope, the various shapes of physiologic and glaucomatous

cups he found. In the former there was certainly pressure from within. The glaucoma cup was usually a simple and symmetric enlargement of the physiologic cup; in a small number the conical enlargement was added on to the cylindric form. If most of the glaucomatous cups were enlargements of the physiologic cups, caused by internal pressure; then, presumably, smaller degrees of pressure, acting on cups in which the tissues were weak, would cause lesser degrees of enlargement, without necessarily producing any deterioration in vision.

Very varying degrees of tension came on in middle life without symptoms arising from it. Pressure was not the only factor; the resistance of the disc must also be taken into account. Only those cases should be included under the term glaucoma in which there was sufficient pressure to interfere with the function of the organ. In the cases of high pressure without such interference the pressure must be regarded as a danger signal.

In these latter cases an accurate and thoro investigation should be periodically carried out, and all predisposing causes as far as possible eliminated. The author admitted that his main contention, that there was a tendency for the physiologic cup to enlarge with advance in age, was not proved, but only inferred. Much might be done, however, to confirm or refute the idea by systematically studying and following out a few cases over a course of years, with accurate diagrams taken at certain intervals.

DISCUSSION. Mr. A. Hugh Thompson said the paper supported the view that there was a distinct relation between a large physiologic cup and a glaucomatous cup. In more than one of his own cases there was an undoubted glaucoma in one eye, and a large overlapping physiologic cup in the other. Also, when ordinary glaucoma had occurred in one eye, there was a considerable likelihood of the same condition developing in its fellow. The author's suggestion that physiologic cups were changed into glaucomatous ones owing to unequal resistance of the lamina cribrosa, coin-

cided with his own view. But he did not think that was the usual mode of causation. The ordinary glaucoma was that of the text-books, in which the pathologic condition began at the margin of the disc. He did not think the author had sufficiently emphasized the distinction between ordinary shallow cup, such as most discs presented, and the perpendicular cup, the latter often overlapping, so that the vessels came to the edge of the cup and disappeared from view, until again seen in the lamina cribrosa.

Dr. Rayner Batten spoke of the need of some method of recording cases of central cupping; he did not think the recording of the area alone supplied what was chiefly wanted. The dangerous cups were indicated by their shape. So long as the cupping was restricted to the center it might be looked upon as Nature's trephine hole. Nearly all the cups mentioned in Mr. Pickard's paper seemed to have been central. The cups he, the speaker, was acquainted with generally came quietly up on the temporal side and expanded from there; rarely on the nasal side. Cups would increase under normal pressure. When deep tension and a large physiologic cup coexisted, it seemed to require a slight cause to render the eye glaucomatous.

Mr. M. S. Mayou said the pathologic difference between the two forms of cupping was very great. The physiologic cup was merely the cone of nerve fibers passing into the nerve, whereas the glaucomatous cup was a pushing back of the whole lamina cribrosa. This produced not only a steep-sided cup, but often, in sectioning the disc, one could see the cup bulging out under the sclera on either side. Cupping was dependent not only on the intraocular tension, but also on the condition of the nerve fibers as they passed thru the lamina cribrosa. The essential difference was seen when the cupping passed to the margin of the disc.

Mr. Pickard, replying on the discussion, spoke of his careful work on borderline cases, for it was in those he considered that the true cause of glaucoma would be revealed. He did not

consider the enlargement of the ordinary physiologic cup was the cause of most cases of glaucoma, but in a group of cases that was so.

H. DICKINSON.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Philadelphia, January 4, 1921.

DR. BURTON CHANCE, CHAIRMAN.

Burns of the Conjunctiva.

DR. P. N. K. SCHWENK presented a young man showing two kinds of burns, one a superficial burn of the left eye and the other a deep burn of the right eye. In this case both the palpebral and bulbar conjunctivae were excoriated. The ordinary treatment of such a case is olive oil but in the opinion of Dr. Schwenk a vegetable oil should not be used, a mineral oil such as cosmolin being preferable if one would use an oil. Dr. Schwenk prefers to treat these cases with irrigations of cold sterile water repeated frequently, no other medication being used. He wishes to emphasize the fact that he thinks dionin is contraindicated in these cases.

DISCUSSION.—Dr. McCluney Radcliffe agrees with Dr. Schwenk as regards the use of dionin, thinking that it should not be used in the acute stages but should be withheld for use in old cicatrices, etc.

Dr. Burton Chance: Dionin should be used in old cases but not in the acute stages.

Dr. L. F. Appleman stated that in cases such as the above he uses a 1% solution of holocain in an oily base, principally on account of the antiseptic properties of this drug as well as its analgesic action.

Retained Foreign Body in the Eye.

DR. SCHWENK also presented a man aged thirty who had a penetrating wound of the globe, the X-rays showing a foreign body to be present. The magnet had been used unsuccessfully upon two occasions. The patient now has a retained foreign body, full visual acuity and a comparatively quiet eye.

The case was presented on account of the question of treatment.

Bilateral Traumatic Cataract.

DR. MCCLUNEY RADCLIFFE presented a boy who, while driving cattle, accidentally struck himself across the face with the lash. Following the blow double cataract developed. Under general anesthesia Dr. Radcliffe operated the right eye with a keratome; the left eye being operated by the same method at a later date under local anesthetic. The right eye healed well and there was no subsequent operation, while the left eye still shows some slight reaction subsequent to a capsulotomy. Vision R. 6/6, L. 6/9. The operation performed was the one of Dr. Risley. The keratome is entered at the limbus, the capsule opened with the point of the knife and the cortex milked over the blade of the instrument, especial care being taken on withdrawing the knife to proceed slowly in order to prevent any possibility of iris prolapse.

DISCUSSION.—Dr. Schwenk. After entering the keratome make gentle pressure backward, this being the secret of the operation.

Dr. Chance stated that Dr. Radcliffe's case is but a second instance of simultaneous bilateral cataracts from moderate force which he has seen. In the past twelve months he has operated upon a man in whose eyes were complete cataracts which had been produced by a flying leather belt.

Dr. William Campbell Posey said that he could not remember having seen a similar case of bilateral traumatic cataracts caused by blunt force. He supposed there must be some rupture of the lens capsule, probably posteriorly.

Cataract Showing Hereditary Tendency.

DR. RADCLIFFE also showed a case of a young woman, aged thirty-four, with a cataract first noticed six years ago, shortly after a miscarriage. A combined extraction was done. The patient has three aunts, on her father's side of the house, who have cataracts which appeared about the third decade of life.

DISCUSSION.—Dr. Posey agreed with Dr. Radcliffe that soft cataracts which affect the comparatively young were often hereditary, and cited several cases in his own practice. He dwelt especially on one case, that of a young man who had lost his mind coincidentally with his sight, and had recovered his sanity upon the successful removal of his cataracts by operation.

Perforating Wound of the Globe at the Limbus with Recovery.

DR. J. MILTON GRISCOM exhibited a case illustrating the conservative treatment of a severely injured eye. The patient, a male aged 25, was struck in the right eye on November 30, 1920, by a flying piece of wood. When admitted to the Wills Hospital a few hours later there was a gaping wound at the limbus, up and in, with prolapse of the iris and vitreous. Under rest in bed, atropin and ice compresses in two weeks the wound had healed with an anterior synechia, and a cyst had developed in the sclera at the site of the injury. This grew rapidly in size until it was three by four millimeters. A compress bandage was applied and a solution of alum, eserin and adrenalin instilled twice daily; with the result that at the time the case was exhibited the cyst had entirely disappeared, the eye was quiet and the tension was normal. Dr. Griscom thought the case was of interest because it illustrated the value of postponing enucleation, in what at first may seem a hopeless condition, until the case has been under treatment and observation for a few days.

DISCUSSION.—Dr. Schwenk mentioned a case in his service a number of years ago who had several iris cysts and stated that the case resembled the present one very much.

Distension of the Ciliary Segment of the Globe.

DR. BURTON CHANCE exhibited a case of distension of the ciliary segment of the globe in a young man who had had bilateral cataracts which had been extracted two years ago. When discharged in 1919 there was nothing abnormal noted in either eye. Today the patient returned to the hospital be-

cause of impaired sight in his left eye and swelling of the globe in the anterior segment. A huge bladder-like swelling of the entire superior aspect of the segment was present, in the nasal third of which were two or three purplish elevations resembling uveal tissue seen in staphylomatous ectasias. The distension extended for some distance below the external angle of the extraction cicatrix, which was well within the cornea and seemed to be free of iris tissue. Chance was inclined to regard the case as one of cystic distension of the ciliary body caused by a disturbance of the body and probable inclusion of the lacerated tissues during the healing of the wound after the extraction of the cataractous lens.

Fuchs' Superficial Marginal Keratitis.

DR. L. W. HUGHES presented for DR. WILLIAM ZENTMAYER a case of Fuchs' superficial marginal keratitis. The patient was a colored man, 25 years of age, with a history of inflammation in his left eye of seven months' duration and in the right eye of two months' standing. The patient admitted that he had gonorrhea ten months ago, also an inguinal adenitis seven months ago. In the right eye there was a waxy concentric superficial infiltrate, invading the cornea from the periphery except on the nasal side, the width of this zone of infiltrate varying from two to three millimeters. The line of extension was sinuous, slightly denser than the other parts and presented fine granulation like elevations which stained faintly.

Many fine, straight vessels invaded the affected area from the limbus. The center of the cornea was clear and there was slight ciliary injection. In the left eye the condition was similar to that in the right, except that the infiltrate was denser and there were some foci near the center of the cornea; and in this eye the vascularization was less marked. The Wassermann was negative and the von Pirquet positive. Under small doses of old tuberculin there has been a gradual improvement in the eye condition, also in the patient's general health. Dr. Zentmayer wished to have stated that he had been aided

in reaching this diagnosis by Dr. C. S. O'Brien.

DISCUSSION.—Dr. Posey thought the case one of hyperplasia of the epithelial element of the cornea, and vascularization not unlike that of the salmon patch in interstitial keratitis. He thought the case would probably prove to be specific.

C. S. O'BRIEN, Secretary.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

January 11, 1921.

DR. ROBERT FAGIN, in the chair.

Foreign Body in the Vitreous.

DR. E. C. ELLETT presented a young man who was struck in the right eye by a piece of steel while working on a truck January 6. There was no irritation of the eye. There was a small scar on the cornea and lens capsule and well developed lens opacities. Vision 1/200. X-ray showed a foreign body in the ball. Dr. Ellett proposed to attempt the extraction with a giant magnet and in the event this procedure failed to try to remove it thru a scleral incision.

DISCUSSION.—Dr. Lewis said that the lens picture was very pretty and advised watchful waiting.

Dr. Stanford could not understand how a steel body could remain suspended in the vitreous and leaned to removal by the posterior route with the magnet.

Dr. Blue agreed with Dr. Sanford.

Dr. Cook spoke of a case in which a piece of steel was removed by way of the anterior route with the magnet.

Dr. Simpson advised the posterior route.

Bilateral Trephining and Complete Iridectomy for Glaucoma.

DR. ELLETT presented a lady upon whom he had operated each eye for glaucoma. July, 1913, she had an acute attack in right eye, the vision having been previously normal in each eye with the correction of 1.50 D. of myopia. This attack apparently subsided under treatment and she had no fur-

ther trouble until March, 1915, when she said that she had another attack in the right eye. Dr. Ellett saw her in June, 1915, at which time the tension was 37 right eye and the vision 20/30 with correction. The field was contracted. The eserine which she was using was stopped and the tension went to 57. On June 12 a trephining with complete iridectomy was done. On June 13 she had an acute attack in the left eye and, on June 15 the same operation was done on this eye. Now, 5½ years after the operation, the fields are exactly the same as they were two months after the operation. Vision 20/25 each eye, with glasses, and the tension is 20 right eye and 17 left eye. There is apparently no filtering scar and the good result is probably due to the iridectomy.

DISCUSSION.—Dr. Levy said that he is a firm believer in iridectomy over trephining.

Dr. Shea asked Dr. Ellett if he ever applied treatment to the nasal ganglion in cases of glaucoma. Dr. Ellett replied that he had not.

Dr. Ellett said that he had tried to show cases of long distance results at the society meetings. In this particular case he did not believe that the trephine had done good but that the good result was due to the iridectomy.

Tumors of the Lids.

DR. FAGIN presented a case of tumors of the left eyelids. This case was presented to the society previously, also to the Tennessee State Medical Society two years ago and later to the Colorado Ophthalmic Congress. The tumors were on the inner surface of each eye lid. The diagnosis from a clinical and microscopic standpoint has been very difficult to make. Several hundred oculists have examined this patient, most of whom said that they had never seen anything of the kind. Dr. Finnoff's findings from a microscopic section of one of the growths were those of lymphomata or new growths similar to tonsillar tissue. Now the growths are only on the left lids but are larger than they were a year ago. Dr. John M. Maury applied radium to the right lids on two

occasions in the fall of 1919 and without the least disturbance the growths promptly disappeared. Six months ago the lymph nodes of the right side of the neck greatly enlarged and several were removed surgically by Dr. Crisler. Microscopic examination did not show malignancy. Two months ago the left cervical nodes enlarged greatly. One week ago Dr. Chapman administered treatment with X-ray with the almost complete disappearance of the swelling.

DISCUSSION.—Dr. Blue suggested Mikulicz' disease.

Dr. Chapman said that he used diffuse X-rays to the neck, long bones and spleen.

Dr. Lewis said that the condition was a relative to Parinaud's disease.

Dr. Levy had thought of leprosy, and thought it might be some form of glanders.

Dr. Ellett said that it could not be Parinaud's disease because it was not a conjunctivitis, and that Mikulicz' disease involves the lacrimal gland, whereas this case was not such involvement; and asked why not use radium on this left eye as it had been so efficacious in the right eye.

Dr. Fagin said that this man was seen by Dr. Jackson and Dr. Knapp at Denver and that Dr. Jackson said that he had never seen anything of the kind before, thereby proving its rarity. He suggested the trial of radium or the X-ray on one lid at a time as a scientific inquiry. He stated that the tumor had grown in the last six months.

Foreign Body in the Eyeball.

DR. FAGIN presented a boy 14 years old who was struck in the right eye by a part of the head of a nail three years ago. The eye was treated by an oculist at Monroe, Louisiana, but the foreign body, which penetrated the cornea just above the pupil, was not found or removed. Vision was soon lost. The iris has become discolored and atrophic. The vitreous is filled with opacities, and since three days ago the eye has been very red and painful. He had advised immediate enucleation of this blind, painful eye but the mother had refused to have it done.

DISCUSSION.—Dr. Stanford said that the tension was the same in each eye and advised removal.

Dr. Simpson advised the same.

Dr. Fagin said that this boy had been in the state school for the blind, altho left eye vision was 20/20.

Faint Opacity of Cornea and Chorioretinitis.

DR. FAGIN presented a young man of 16, who had only light perception in right eye. The patient denied ever having had pain or inflammation in the eye and claimed that the vision had been poor all his life. The left eye was normal. The right pupil was dilated with homatropin and a faint opacity of the cornea in its center was visible. There was a marked chorioretinitis in the macular region. The teeth were peg shaped and almost typically Hutchinson in character. Family history negative. Wassermann today negative.

DISCUSSION.—Dr. Lewis thought it a beautiful and typical case with Hutchinson teeth.

Dr. Ellett said that there was a healed interstitial keratitis and said that we probably overlook the eyeground in cases of interstitial keratitis. He thinks nothing of one negative Wassermann.

Dr. Blue suggested the exhibition of KI and then trying another Wassermann.

EDWIN D. WATKINS, Secretary.

JOINT MEETING OF THE CHICAGO OPHTHALMOLOGICAL AND THE CHICAGO NEUROLOGICAL SOCIETIES.

December 16, 1920.

DR. ALFRED N. MURRAY, CHAIRMAN.

Polioencephalitis Superior and Inferior.

DR. G. B. HASSIN reported the case of a young man, 21 years of age, an imbecile since early childhood, who entered the neurologic service of the Cook County Hospital, complaining of inability to swallow (six weeks' duration), to judge distance (since childhood) and speech troubles. The examination revealed a paralysis of all the cranial nerves (from the third to

the twelfth), inability to judge distance (disturbance of spatial sense) and marked defects in speech (dysarthria) and deglutition (dysphagia). The clinical picture was that of ophthalmoplegia and bulbar paralysis. The sensibility reflexes, including the pupillary, the genitourinary organs were all normal.

The patient died suddenly two days after his admission to the hospital. The histologic examination of various portions of the brain showed marked degeneration of the gray matter, especially of the midbrain and medulla, and proliferative changes in the glia tissue. The latter showed a great wealth of protoplasmic glia cells, various types of gitter-cells, many gliogenous formations, such as myelophages, and abundance of fat like substances within gitter cells. Infiltrative inflammatory phenomena and hemorrhages were absent. Occasionally scattered red cells, mostly enclosed with gliogenous formation, could be seen within the changed glia cells.

The degenerative changes in the gray substance were in the form of chromatolysis, neurophagia, fat infiltration, broken up myelin, etc. The cortical areas were also involved, especially in the occipital lobe, the angular gyrus, cuneus and precuneus. The pia arachnoid, in this region of the brain, showed enormously distended meshes infiltrated with mesothelial cells, gitter cells and abundance of hemorrhagic foci. Fat like substances were also found in the choroid plexus.

The third nerve showed signs of secondary degeneration, in its early stages; namely, an abundance of so-called Marchi globules enveloped by proliferated glia tissue (Schwann cells).

The histopathologic changes generally resembled those to be found in degenerative diseases of the nervous system, such as amyotrophic lateral sclerosis, subacute cord degeneration, multiple sclerosis, etc., being, however, especially pronounced in the midbrain and medulla.

The conclusions to be derived from the histopathologic studies of this case are, (1) that the subarachnoid space

derives its contents, in this case fat, from the brain tissues proper; (2) that the choroid plexus is probably not so much concerned in the production of the cerebrospinal fluid as in aiding in its purification and rendering it more passable.

DISCUSSION.—Dr. Hiram J. Smith said that the causal sites of ocular paralysis in general might be divided into orbital and intracranial. The intracranial might be considered as supranuclear. Nuclear fascicular—that is, fiber from nucleus or deep origin to the surface, or superficial origin and lesions of nerve trunk between superficial origin and the orbital fissure. In extensive progressive ophthalmoplegia the lesion was nearly always nuclear. Supranuclear lesions, that is, of cortex association centers and intracerebral tracts, caused conjugate paralyzes of eye muscles, seldom isolated paralysis, with the exception of ptosis. In this type of conjugate paralysis, the eyes usually were able to turn toward the affected side of the brain, but not toward the opposite, that is, “look to the lesion,” as contrasted with conjugate paralysis of pontine origin, where the eyes might turn from the lesion.

Bilateral ophthalmoplegia was not necessarily due to bilateral involvement of the nuclei. Fibers from the nuclei of a given side passed to the nuclei of the opposite side so that a lesion of the right third nucleus might cause a disturbance of the muscles of the opposite side as ptosis. The affection of the opposite side in a case under observation, cleared up in 48 hours, probably thru compensatory action of the unaffected nucleus, as the paralysis on the side of the lesion persisted.

In progressive nuclear involvement, one would naturally look for adjacent nuclei to be affected at the same time, or in succession, and this happened. The third and fourth, or sixth and seventh, were involved together, as well as adjacent nuclei of other cranial nerves.

The diagnosis of the cause of ocular paralysis might be suggested by the type and extent of the trouble. In nuclear paralysis the underlying neuro-

logic affection would be cleared up, usually thru the finding of other manifestations than the ocular. The characteristics of multiple sclerosis were readily perceived. In bulbar paralysis the early involvement of hypoglossus and glossopharyngeus was met with. In myasthenia gravis double ptosis was seen early, but the rapid fatigue of muscles of head and neck, especially muscles of mastication, was characteristic. Nevertheless, many obscure clinical pictures presented themselves. In Dr. Hassin's case he had an opportunity to observe, postmortem, what was actually taking place during the course of the disease.

Dr. Peter Bassoe thought it would be profitable if Dr. Hassin would emphasize the distinction between that disease, polioencephalitis superior and inferior caused by other infections, and the purely degenerative affections of the same regions. A similar problem had been worked out in the case of the spinal cord. For a long time everything was called myelitis without sufficient distinctions between inflammations, degenerations, and vascular lesions.

Dr. H. Douglas Singer stated that according to the statement of the essayist, the spinal fluid was absorbed apparently both thru the arachnoid villi and thru the choroid plexus. He wondered what was the source of the spinal fluid—if it was true that it was absorbed at both sides of the brain. The usual view was that the choroid plexus acted as a gland to secrete the fluid, but Dr. Hassin apparently had an altogether different view.

Dr. Michael Goldenburg said that he was under the impression that the spinal fluid was secreted by the choroid plexus, and that the epithelium covering it was merely a filter.

Dr. Hugh T. Patrick asked how the fat and epithelial cells in the choroid plexus got there from the spinal fluid, and if anybody had ever found fat in the spinal fluid in this sort of a case.

Dr. Hassin, in closing the discussion, said that he did not intend to consider in detail the important physiologic points suggested by the pathologic

studies of a remarkable case. He merely wished to demonstrate their probable significance.

The masses of lipid substances in the gray matter of the midbrain and medulla were striking, but nobody ever stated the fact of their presence in the subarachnoid space and the choroid plexus. Evidently, fat like substances had not been looked for in these regions, or proper methods were not used. In fact, very few histopathologic studies of so called hemorrhagic superior polioencephalitis had been recorded, the authors contenting themselves with repeating what Wernicke said. Schroeder and Spielmeyer were the first to point out that Wernicke's polioencephalitis was not an encephalitis at all. In his (Dr. Hassin's) opinion the only true superior polioencephalitis was represented by epidemic (lethargic) encephalitis in which the inflammatory phenomena were principally, though not exclusively, confined to the midbrain; in the Wernicke's type the morbid process had the same localization, but is of a degenerative, and not of inflammatory character.

As to the probable function of the choroid plexus and the spinal fluid, he wished to state that according to some authors, the cerebrospinal fluid originates partly in the brain, partly in the choroid plexus. The abundance of fat in both these structures indicated that their contents were wholly derived from the brain tissues. In the case under discussion, these contents were lipid substances; in cerebral hemorrhage they would be blood pigment and so forth. The choroid plexus, therefore, was to be looked upon as a filter for the cerebrospinal fluid which it rendered passable thru the various channels of absorption. Generally speaking, the study of pathologic brain conditions might help to solve problems which so far defied the efforts of the ablest experimental workers.

The Pupil in Health.

DR. E. V. L. BROWN stated that according to Salzmann the pupil in health had a diameter of approximately 4 mm.

The consensual reaction depended

upon the stimulation of the rods and cones in the relatively small area of the macula. The stimulus was then carried by the optic nerve to the chiasma, where partial decussation took place, thence via the tractus opticus with the pupillary fibers lying dorsolateral to the corpora quadrigemina, and finally to the nucleus of the oculomotor nerve, which functioned as the pupil nucleus as well, thru the fibers which crossed over from the right to the left side. Therefore any stimulus of the right macula went to the left pupil, as well as to the right and was then sent down the left oculomotor to the sphincter of the iris on each side, the left pupil narrowing at the same time the right did. This test was of the greatest value in establishing the functional integrity of the most vital part of any injured eye. Many a patient who had just suffered a severe accident to a considerable portion of the front of his eye could easily and quickly, and honestly, be told that the eye was not lost, even when the cornea was cut, the anterior chamber full of blood, the iris prolapsed or the lens dislocated, for the pupil of the fellow eye narrowed when light was thrown into the injured eye. One of the uncanny things about the consensual pupil reaction was the fact that in rare instances of disease of the cortex, such as tumor of the occipital lobe, etc. the one eye really did not see, or rather the cortex of neither side saw, yet the pupil motor stimulus was sent up the one optic nerve, across to the other side and down that oculomotor nerve and the pupil of the opposite side narrowed as perfectly as if the light and color and form perception were perfect.

Widening of the pupil took place thru irritation of the sympathetic. The pupil widening fibers left the spinal cord at the level of the upper two dorsal and the lower cervical vertebrae. Fibers from the upper thoracic ganglion join with some from the inferior cervical ganglion. Here there is a union with the hypoglossal. The carotid branches were then given off and the pupillodilator fibers proceeded in the skull to the Gasserian ganglion and united with the first branch of the tri-

geminus. So united, they proceeded to the eye via the two long ciliary nerves to the dilator sheet of muscle in the back layers of the iris. They did not pass thru the ciliary ganglion at all.

Any irritation of the cervical sympathetic could, therefore, produce dilatation of the pupil. Furthermore, the irritation or stimulation of any sensory nerve might produce a dilatation of the pupil. The path here was to the cerebral cortex, the oculomotor nucleus and to the iris via the third nerve, ciliary ganglion and short ciliary nerves to the spinster pupillae, which relaxed and allowed the dilatator to work unopposed. Furthermore, the pupil widened upon any psychic stimulus, and volitional impulse and any vivid mental concept.

DISCUSSION.—Dr. H. Douglas Singer stated that he often found recorded, "Pupils sluggish to light," and he had never been able to satisfy himself as to what most people meant by sluggishness. Did it mean that the reaction was slow or that the degree of contraction was diminished?

In his opinion, as to the pupillary light reflex pathway, the fibers that conveyed the stimulus for the light reflex left the optic tract before it reached the pulvinar. They apparently left in the region of the thalamus and traveled along the inner side of the thalamus. This seemed proven to him by two cases of tumors seen many years ago, involving the back part of the third ventricle and damaging the optic thalamus on both sides, in both of which there had been Argyll-Robertson pupils.

Dr. Hugh T. Patrick stated that the dictum of Uhthoff that even if there was more illumination of the pupil on one side, the pupils remained equal, was wrong. He had once ventured this opinion in Germany, and had been corrected with characteristic Prussian abruptness, but had many times since then corroborated his observations.

Another curiosity could be referred to as a normal pupil: It was known that occasionally an individual could voluntarily dilate his pupil, by picturing to himself some peculiarly horrible

scene, generally from his own experience.

Dr. Patrick said he would be better pleased if Dr. Brown would speak of the segments of the cord instead of the vertebrae.

Dr. Ralph C. Hamill said that in testing the pupils, especially of colored men with very dark irides, it was difficult to tell whether there was a light reflex or not. Dr. Brown had mentioned the fact that the near sighted individual had large pupils and he wondered whether in some individuals where the pupil was under more or less spasm small changes of size would be visible. Also, in testing the pupils of a great many men in a short space of time, as was done with some of the men in the training camps, it was observed that there were certain kinds of pupils that corresponded to the degree of pigmentation of the iris.

Dr. I. Leon Myers thought that the influence of the sympathetic nervous system and especially that which was noted in emotional disturbances, fright, etc., was not the only one that brought about dilatation of the pupil. It had been noted many years ago that in stimulating the cortex of an animal while it was completely anesthetized and the stimulation was strong enough to produce epileptiform fits, the pupils would promptly dilate. This had no connection with stimulation of the cortex, when it produced conjugate deviation of the head and eyes.

Dr. Robert von der Heydt stated that as to light and dark irides, there were at least two reasons why eyes with dark irides did not respond to light as well as those with lighter colored irides. One was a sluggishness in response on account of the weight of the added pigmentation in the dark irides. In addition light would penetrate a light colored iris more readily on account of its greater transparency, and the retina would receive more stimulation for that reason.

Dr. H. W. Woodruff spoke of the statement made in the standard textbooks on ophthalmology that "inequality of the pupils was always pathologic." Reference had already been

made to the larger pupil in myopia. This also held when one eye was myopic and one hyperopic, namely, in anisometropia. In such a case one pupil was distinctly larger than the other. When he first began the practice of ophthalmology he did not know this and supposed a patient with inequality in the pupils must have a serious nerve lesion. For this reason, in examining these cases the refraction should be known.

Dr. Charles P. Small said that the difference in the reactions in the normal pupil were illustrated in a case seen recently. The patient was a man in perfect health, with all the laboratory examinations negative, who was refused an increase in life insurance because he was said to have an Argyll-Robertson pupil. The pupils were widely dilated and almost immobile but they did react very sluggishly when carefully examined. He did not know why he had such a very feeble reaction, and wished some of the neurologists would explain it to him.

Dr. C. W. Hawley was reminded of a case similar to Dr. Small's which he had reported. His patient had widely dilated pupils all her life without pupillary reaction. Suddenly the left pupil was contracted to the usual size and developed reaction. She came to have the pupil dilated to look like the other. He told her to go home and pray that the other would contract like the left.

As to one pupil dilating more when it was receiving more light than the other, he had seen a similar case within two or three months. During the examination a friend of the patient asked why one pupil was dilated more than the other, and he thought it might be because that eye was receiving more light than the other. On turning the patient around he got the opposite effect and proved that this theory was correct.

Dr. Brown, in closing the discussion, in reply to Dr. Singer said he had always understood sluggishness to refer to the rate of reaction rather than the degree. He was glad to hear Dr. Patrick emphasize the fact that direction

of light influenced reaction, due to the fact that one eye had more stimulus.

Dr. von der Heydt had answered the question about the pigmentation and the hypermetropic eye with the small pupil. It should also be noted that iridocyclitis was more frequent in lightly pigmented eyes than in heavily pigmented ones.

ROBERT VON DER HEYDT, Corresp. Sec.

COLORADO OPHTHALMOLOGICAL SOCIETY.

January 15, 1921.

W. F. MATSON, presiding.

Capsulotomy After Thirty-three Years.

C. E. WALKER, Denver, presented a man aged fifty-five years upon whose left eye a capsulotomy had been successfully performed thirty-three years after injury by a piece of wire, which had passed thru the cornea and lens. The vision of the eye with a plus 11 sphere was 20/200.

Spontaneous Rupture of Lens Capsule.

C. E. Walker, Denver, presented a man, aged sixty-one years, in whom, sixteen years after cataract extraction, complete spontaneous rupture of the posterior capsule of the lens was found to have occurred. The posterior capsule had been unruptured at the original operation. The vision of the eye at the time of report was light perception.

Retrobulbar Neuritis.

W. C. and W. M. BANE, Denver, presented a woman aged forty-three years who had been presented at the December meeting on account of retrobulbar neuritis, which had begun about November 22, 1920. The consensus of opinion at the December meeting had been that the ethmoids and sphenoids should be drained. On December 7 the vision had been R. almost nil, L. 5/30 —. On December 22 submucous resection of the septum was done, and the sphenoids were drained. On December 23 the vision was R. counting fingers at three feet, L. 5/20 —. There was steady improvement in the vision, which on December 30 was R. 2/60, L. 5/7.5 — 2. On

this date both middle turbinates were amputated, and the left posterior ethmoid cells were exenterated. No pus was found in any of the sinuses. On January 14 the vision was R. 3/60 +, L. 5/4 — 3.

DISCUSSION.—Melville Black, Denver. The negro girl presented at the last meeting on account of neuroretinitis was operated upon at the county hospital, the remainder of the nasal sinuses being cleaned out. The last time she was at the clinic the vision was normal in each eye, and the swelling of the optic disc was very much diminished, probably to two or three diopeters.

G. F. Libby, Denver. Dr. Gallaher is of the opinion that in removing a certain amount of blocking, which exists in these cases as regards the venous circulation, we get an improvement of the nutritional condition of the optic nerve, especially of the retrobulbar portion.

Melville Black, Denver. I do not think there is anything especially new in that hypothesis, altho there is undoubtedly something in it. That the whole process is due to such an etiology I question, for there are important connections between the drainage channels of the sinuses and the optic canal. The relief from blocking produced by opening up the sinuses explains the rapid improvement obtained from the operation, much more readily than the idea that the disturbance is purely a matter of infection. The subsequent improvement is probably another affair. I believe actual infection will be proved as time goes on.

D. H. Coover, Denver. In such cases as this I have found definite improvement of vision only where there was a great deal of hemorrhage, and I have the habit of telling the rhinologist to let the patient bleed as much as possible. I remember three or four cases in which there was profuse hemorrhage and improvement was rapid, but the cases in which there was very little hemorrhage did not improve so rapidly.

W. C. Finnoff, Denver. The negress Dr. Black referred to still has about two diopeters of swelling, and Dr. Coover told me that she still had some swelling

round the sphenoidal sinuses, so that I said I thought it was important to get rid of the sphenoidal trouble completely, otherwise we were likely to get atrophy of the optic disc.

W. H. Crisp, Denver. There seems to be some difference of opinion between eminent rhinologists as to the possibility of diagnosing purely hyperplastic conditions at the time of operation on the sinuses. I understand that Dr. Gallaher feels able to determine when he encounters hyperplasia, but other rhinologic friends tell me that they do not believe it possible to be sure of the condition at operation. Some time back I had a patient who showed a remarkable improvement in the eye condition for a few days after a nose operation which was followed by profuse hemorrhage; but the eye condition to a large extent relapsed later on.

Dr. Finnoff. I think in all these cases of hyperplastic rhinitis we have a definite infection, altho not with organisms that produce pus.

F. R. Spencer, Boulder. There is also in many cases a relationship between disturbances of the ductless glands and hyperplastic ethmoiditis.

Disciform Keratitis.

W. C. and W. M. BANE, Denver, again presented a woman aged twenty-seven years, who had been shown two months previously on account of a disciform keratitis in the left cornea, the center being one mm. downward and outward from the center of the cornea. A blood Wassermann test and the result obtained from the use of mercury were negative. The center of the disc had for a time had the appearance of separating from the healthy cornea. On February 3, 1921, the vision of this eye was 5/20, the opacity was thinner, and blood vessels had entered every part of the diseased area.

DISCUSSION.—G. F. Libby, Denver. Although at first this looked like so-called disciform keratitis it now has the appearance of an ulcer of the cornea which is healing.

W. C. Bane (closing). During the development of this case there were two or three whitish deposits in the general gray mass, which have disappeared entirely under the use of cinnamat of soda.

Epithelioma of Eyelid.

W. C. and W. M. BANE, Denver, again presented a man aged sixty-two years, who had been shown December 18, 1920, on account of a small epithelioma at the margin of the lower eyelid. On January 1 the diseased tissue had been removed with a sharp curet, and the raw area at once cauterized with trichloroacetic acid. After twelve days the wound had contracted very little, there being a crescentic notch in the lid 4 by 7 mm. in diameter. One dose of radium (25 mgs. for 6 hours) had just been used, and a second application of two hours would be made in two days' time. (A supplementary report on January 28 stated that all inflammation had subsided and the notch was one-half the original size, the surface having healed.)

DISCUSSION.—E. M. Marbourg, Colorado Springs, suggested that where radium could not be obtained excellent results could be had from the use of scarlet red on the superficial growths.

F. R. Spencer, Boulder. One of the tungsten production companies in Boulder will probably be able shortly to furnish radium emanations.

Melville Black, Denver. When cicatrization is complete this eyelid will be rather unsightly, and it may be necessary to do some plastic work. This could perhaps most satisfactorily be based upon a V-shaped incision at each corner of the eye.

Recurrent Iridocyclitis.

H. R. STILWILL, Denver, and MELVILLE BLACK, Denver, presented a woman aged sixty-two years, who had first come to Dr. Stilwill in December, 1913, on account of an attack of iridocyclitis. There were old anterior synechiae on the anterior capsule of the lens. After two weeks' treatment the eye became quiet, but similar attacks occurred in July, 1915, and July, 1916. In August, 1917, the patient came to Dr. Black with a record of a white scum having formed in the left cornea in the preceding January. The corneal opacity had not disappeared, but the eye had been free from redness and soreness for several months before her first visit to Dr. Black. No trouble had developed in the right eye until about a month pre-

viously. There was an area of episcleritis below the cornea with a slight pebbly appearance of the lower third of the cornea. A Wassermann test was negative.

The patient had been under the care of a starvation specialist and was very much reduced in weight. The trouble with the right eye had started while the patient was under the starvation treatment. No elevation of temperature followed an injection of 0.5 mg. of old tuberculin, but there had been a local reaction at the site of the injection. Tuberculin treatment was kept up for about one year, at the end of which period the eye seemed to be free from inflammation. In June, 1920, the right eye again became red and photophobic. It was necessary to substitute homatropin on account of an attack of dermatitis having been produced by atropin. There had been more or less continual iridocyclitis since that time. Thyroid extract had been used without benefit.

DISCUSSION.—E. M. Marbourg, Colorado Springs. I noticed that this woman's joints were gouty and her arteries hard.

G. F. Libby, Denver, mentioned a suggestion recently thrown out by a medical friend, to the effect that gout was probably due to focal infection.

E. R. Neeper, Colorado Springs. I suggest that the patient should be tested by the complement fixation test for old gonorrheal infection. I have seen two cases clear up wonderfully after the diagnosis had been established in this way. The second thing I should consider would be iridectomy.

Dr. Black. The question of doing an iridectomy has presented itself to me, but I hesitated to operate on this one eye because of the extremely unsatisfactory nervous condition of the patient. I was afraid she might go out of her mind if the operation deprived her for a time of the vision of this one eye.

C. E. Walker, Denver. Even if the patient is so flighty the iridectomy ought to be tried; perhaps tried first on the worse eye to demonstrate the action of the operation to the patient, al-

tho you would not expect much from that eye.

Cholesterin Crystals or Asteroid Hyalitis.

MELVILLE BLACK, Denver, presented a patient on account of the presence in the vitreous of each eye of a great number of glistening particles, perhaps of the nature of cholesterin. Dr. Jackson had suggested that the case might be one of asteroid hyalitis. The crystals were much more massive than in the usual cholesterin case.

DISCUSSION.—Edward Jackson, Denver. The appearance of the right eye is very striking. These do not look like the ordinary scintillating crystals of cholesterin. They are not so metallic, are not angular, and are all about the same size. They are white like snowflakes. There is not so much movement of the particles as in the marked cholesterin cases, that is to say, the range of movement is not so great. They seem to be in a consistent vitreous, which does not allow them to float about in the snowstorm fashion of the typical cholesterin shower.

Congenital Lens Dislocation with Iris Displacement.

W. C. FINNOFF, Denver, presented a Mexican boy on account of bilateral congenital dislocation of the crystalline lens, the right dislocation being up and out and the left up and in. The most striking feature of the case was that at about 11 o'clock in each eye the iris was pushed forward against the posterior surface of the cornea, and was fixed at this point, altho the remainder of the iris was tremulous.

F. R. SPENCER, Boulder, referred to a case of bilateral congenital lens dislocation in a giantess who showed a number of other anomalies.

Edward Jackson, Denver. In many cases of congenital dislocation the lenses are not so large as normal. In this case the lenses seem almost normal in size, and it may be that a full sized lens being drawn up in this way accounts for the pressure against the cornea. Probably the best way to start

on the refraction of these eyes would be with the ophthalmoscope rather than with the retinoscope. I think that rather more than half of the pupillary space is aphakic.

Lens Dislocation. Glaucoma. Posterior Sclerotomy.

W. F. MATSON, Denver, presented a man aged sixty-two years who in 1882 had received a blow from a fist on the right eye. Cataract was noticed in 1892. The lens was dislocated back into the vitreous, and a history of the vision having improved about 1910 suggested that the lens had dropped back about that time. Early in January, 1921, he developed an attack of glaucoma and the eye became stony hard. Posterior sclerotomy was done, sufficient vitreous being evacuated to produce minus tension. Under the further use of eserine and hot applications the eye had kept quiet, but only one week had elapsed since operation.

Steel in Crystalline Lens.

C. O. EIGLER, Denver, presented a man who twenty-five years previously had received an injury to one eye from a piece of steel. The eye had been badly inflamed for three or four weeks, but there had been no pain since. The piece of steel was plainly visible, being held firmly between the cornea and crystalline lens at the upper part of the pupil. The eye was not irritable. Vision of this eye was light perception. Should anything be done?

DISCUSSION.—C. E. Walker, Denver. Altho the eye ought to be watched it should be left alone as long as the piece of steel does not drop down.

Edward Jackson, Denver. If you interfere in any way that I have been able to think of you will certainly have to puncture the lens again, and in all probability will produce complete cataract. There seems to be no evidence of siderosis. The man should be warned that if he goes away and trouble begins he should consult a competent ophthalmologist.

WM. H. CRISP,
Secretary.

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DETAIL IN THERAPEUTIC MEASURES.

"Trifles make perfection, but perfection is no trifle." Nowhere does this apply with more truth than in ocular therapeutics, whether by medical, surgical, or hygienic measures. It is true in other lines of work. The great commander is a master of detail, so that no missed connection can disarrange his plans. The successful business man must understand the processes of manufacture or exchange that he has to direct. The surgeon's mastery of technic makes him the smooth finished or effective operator; and only years of close observation, thought and effort to do things just so, give him that mastery.

One operator prefers one operation and does it with brilliant success, another prefers a different operation and with it is equally successful. Each has mastered the technic of his favorite procedure, by becoming perfectly familiar with every step in it, so that they follow each other with perfect smoothness and move straight to the

desired result. Each understands fairly the method of the other, and has probably tried it. But if they were to exchange operations, the strain on the operator would be increased, and the results not nearly so good.

A class of medical students was asked the treatment for ophthalmia neonatorum. All mentioned silver nitrat; but not one in ten gave the frequency or strength for the applications; and not a single one went into those details of its application that make the difference between success and failure. The whole medical profession has heard something of the use of tuberculin, but not one in one hundred has mastered those trifles of detail that enable him to use some one preparation with real efficiency. It is the overshadowing importance of detail in our work, that justifies and compels specialization in medicine.

To speak of a discussion of detail in technic as a "kindergarten exercise" may disarm criticism; and permit those who will always be incapable of good surgery to pass the article by as unworthy of their attention, in the be-

lief that it is intended for some beginner who needs that kind of instruction. Very rarely does the beginner know enough of its value to appreciate the consideration of such trifles. Its real value and significance will be appreciated by the experienced surgeon, who has almost perfected his technic by many hours of anxious thought given to just the point discussed. He may not be ready to give up the method he has already chosen and practiced, but he is ready to do some more thinking about it; and so he welcomes the view of a colleague who also thinks about it minutely, but takes a little different point of view.

Probably we are all too ready to ignore the importance of detail. We note that a certain article is on a certain general topic, that it deals with some particular operation; but we fail to extract the one grain of gold, the one minute detail of modification that it suggests, which really justifies the writing of it. Often the author is largely to blame for this, by putting in so much else, that the one point which should make his communication valuable is concealed in the mass of more general statements. But we all have the habit of looking for and judging by the general statements, and not seeing the detail that can really help us.

Some years ago the writer described a form of cataract knife. It was not essentially new, for practically every form of knife was used in the first fifty years after Daviel; and those whose names these knives bear today have not done more than suggest trifling changes. But in this instance the point that justified calling attention to it was almost universally overlooked. Even those who tried the knife, and liked it and continued to use it, generally failed to notice this particular point; until their own experience forced it on them. It was that the blade filled the wound until the corneal section was almost complete. The back of the knife pressing down just as hard as the cutting edge pressed up, made the fixation of the eyeball comparatively simple and easy.

Any cataract knife of the right width

does this, the Beer's knife, if properly proportioned, does it. Some operators choose what they call a "broad Graefe knife," ignoring the fact that the distinctive character of the Graefe knife is its narrowness, a character that enables it to change direction in the wound (which it ought not to do) and makes the puncture and counterpuncture possible with the very least exertion of force. It was the control of the two ends of the section by puncture and counterpuncture that gave the Graefe knife its vogue, even at the cost of more difficult fixation. It was to secure puncture and counterpuncture without sacrificing fixation, that led to the choice of a slightly broader knife.

One may think that cataract extraction is such an important operation that everything about it becomes important. Relief of human disability and suffering is so important to our patients, and important to us, that everything that helps it becomes important. And nowhere does this prove more true than in the correction of errors of refraction. No larger field for remunerative attention to detail opens before the ophthalmologist, than this of the correction of refractive errors. The man that leaves refractive cases to his assistant, who has not time to "waste" over minute changes of the direction or strength of a cylinder, may be justly celebrated for operative successes based on his mastery of detail; but his patients never write books or magazines to tell the story of their relief by his glasses.

The eye is a small organ at most. It has often been neglected by the general physician or surgeon on that account. It would seem that one who takes it as his especial field for therapeutic effort should realize the importance of small things. To do things nearly right may give one a mediocre standing in his profession. Always to do them exactly right, so far as this is humanly possible, is what brings the higher success. In the making of an application to the everted lids, in the fixing of an eyeball, in the exact placing of a lens before the eye there is all the opportunity in the world for success or failure.

E. J.

PAPERS FOR THE WASHINGTON CONGRESS.

Ostensibly an international Ophthalmological Congress convenes to listen to scientific papers and the discussions upon them; altho there are other things, as the opportunity for personal acquaintance, private discussions, the seeing of specimens and apparatus that can rightly claim a large share in contributing to the success of such a meeting. It is worth while to inquire, what kind of papers and what number of them are likely to do most for the success of the gathering at Washington next April?

The number of members already enrolled, and the inquiries regarding the Congress that have been received from all parts of the world, indicate that it will be the largest gathering of ophthalmologists that has ever been held in any country. It is safe to assume that every topic of interest to any ophthalmologist will find some interested hearers and discussers in that gathering. Of course, the interests of each member are varied enough for many to be keenly alert to anything new that can be said about any live subject connected with this branch of science; and each session will be less fatiguing and more interesting if it is divided between several subjects and many speakers.

There will be eminent visitors from Europe, South America and Asia, who will each present a paper on some important topic. But it will, also, be very interesting to hear these men express their views on various other topics. The opportunity for this will be afforded only by having these topics presented by papers, that our eminent visitors will have opportunities to discuss. It is very likely that not all the papers offered for the Washington Congress can be admitted to the program; but it is certain that a better program can be arranged if the Committee in charge can have a rather large number and a wide variety of papers to choose from.

If any good paper is prepared and time cannot be found for it in the program of the Congress, the national so-

ciety meetings for 1922 will still be open for its presentation to the profession; and thru them it will get a good hearing. Probably some of these meetings will be arranged so that they can be attended by foreign ophthalmologists, while in this country to attend the Washington Congress. It is possible too that those in charge of preparing the programs for these societies next year will have some difficulty in securing papers of high value and interest when the International Congress attracts some of the best. Even local societies in America should arrange meetings for next year of more than average merit.

There is every reason that each worker in ophthalmology, who thinks he has some material worth presenting to his colleagues, on a subject that is timely and likely to meet some of their broad interests, should go to work, get the educational benefit of preparing such paper, and then offer it for presentation where it will meet the best available opportunity for a hearing. The influence of the Washington International Congress should be felt in the program of every national and local ophthalmologic society in the United States.

E. J.

BOOK NOTICES.

American Academy of Ophthalmology and Oto-Laryngology. Transactions of the Twenty-fifth Annual Meeting. Clarence Loeb, Editor. 510 pages, illustrated. Published by the Society.

This volume, substantially bound in cloth, comes to us less than five months after the meeting, the proceedings of which are recorded in it. This is rather an exceptional achievement in the publication of Transactions. It is all the more notable because this is something of a memorial volume celebrating the first quarter century for this most western of special medical organizations.

The proceedings of the Academy for all the twenty-five years of its existence are here systematically indexed both by names of authors and by topics considered. These indexes make

the papers and discussions that have occupied the meetings of this organization more readily and completely accessible than those published by any other medical society in the world. The value of such indexes will only come to be appreciated as students and writers in the future use them in tracing to its sources the literature of the various subjects considered. Such indexes are a greater service to the profession and humanity than whole volumes of the average medical transaction.

The volume will be more immediately valued for the halftone portraits of all its former presidents, who may well feel honored to appear in such a collection. There are 24 of these, Dr. Alt, the first president, having served for two years. Of these, 17 are still living, indicating the tendency of the Academy to choose young men for its office bearers. This has some important connection with its broad, inclusive, progressive policy, which is illustrated in gathering the largest membership of any society devoted to these specialties in the world, in requiring an examination and certificate in the specialty practiced, in doubling its dues to provide funds to assist in original research, in arranging a course of intensive graduate study for its members, and not least the publication of indices to all its transactions, something not undertaken for most medical societies.

Only about half the papers published in the volume are devoted to ophthalmology. Several of them have been published in this JOURNAL. The others include discussion of such topics as: Ocular Symptoms Due to Intranasal Disease; Heterophoria from Nasal Disease; Some Variant Forms of Keratitis; Minor Affections Associated with Refractive Muscular Errors; Closure of Subconjunctival Fistulae; Methods of Applying Prism Tests; Conservation and Extirpation of the Lacrimal Sac; Chorioretinitis with Detached Retina in Syphilis; Compensation for Eye Injuries; Cataract Operation; Trachoma. Most of these topics gave occasion to general discussion in which some of the most valuable thought regarding them was expressed.

The volume is similar in style to its predecessor in this series of transactions and is exceptionally free from blemishes and errors. It lacks the proper page headings, which have now been generally adopted in medical books because they add materially to the ease and convenience of consulting them. There are other transactions that still exhibit this defect. But the general tendency to progress which the Academy has shown ought to guarantee an early adoption of the better plan.

E. J.

American Ophthalmological Society, Transactions, Volume 18, Fifty-sixth Annual Meeting, 1920. Pages 450. Illustrated, 20 plates, three in colors. Published by the Society, T. B. Holloway, Secretary.

This volume contains biographic sketches of Drs. S. D. Risley, and R. L. Randolph, two of the seven of its members who had died during the past year. Then come the minutes of the meeting, the papers read before it, and seven theses by candidates for membership who were elected at this meeting. Two of these theses were published in this JOURNAL. The subjects of the others were "Diplopia, With Description of Cyclocephalic Monster", by Dr. Emory Hill; "Increase of Hyperopia and Diabetes," Dr. W. H. Roberts; "Visual Disturbance in Hysteria," Dr. Adolpf O. Pfingst; and "Total Keratoplasty," by Dr. J. W. Burke.

Of the 28 papers read before the Society and here published nearly all are accompanied by discussions which followed their presentation. As in the preceding volumes the theses submitted by candidates add materially to the scientific interest of these transactions. They should have a wider circulation than they have heretofore enjoyed.

The Sympathetic System.—Le Sympathique—et les Systèmes associés. Anatomie clinique sémiologie et pathologie générale du système neuro-glandulaire de la vie organo-végétative, par A. C. Guillaume. 8°, 396 pages, 40 ill. Paris, Masson et Cie.

In these days of inquiry into the functions of the glands of internal se-

cretion and the sympathetic system of nerves, with their relation to the functions and health of the body, this comprehensive treatise is very welcome—for it is founded upon the newer ideas of the morphophysiologic and pathologic changes which regulate the so-called vegetative system.

Disturbances of the functions of the neuroglands of organic life and their diseases are legion; and the latter do not come under any nerve classification. The author has made for them a direct doctrine.

The first edition was published in September, 1919, and has been followed by one of October, 1920, a practically new book, as the author has not been contented to simply bring in a few new ideas, but has added eight new chapters, of special interest being the one on the intervention of the system in pathologic processes and its reactions in the course of various diseases. He gives a clear exposition of all of the necessary facts leading to comprehension of the problems of general anatomy, physiology and pharmacology, following with comments upon the pathology and showing how it is possible to clinically examine patients with affections of the sympathetic system and to interpret the results gained thereby.

It is a practical, clinical guide to the physiopathology. Nothing essential to the knowledge of the problem of the vegetative life has been omitted. It explains all that has been accomplished to date in acquiring knowledge of the functions of the internal secreting glands and their relation to the sympathetic nerve elements. It is a book which is impossible of abstract, not for empiricists, but for those scientific practitioners who seek the cause.

Pasteur said: "Without theory practice is but a routine born of habit. Theory develops invention." It thus conducts the searcher for truth along the right way, as well as guides the practitioner. The American Pottenger is quoted: "Remember there is a patient who has the disease, as well as the disease which has the patient." As may be well understood, there is constant reference to the eye, pupillary re-

flexes, etc., thruout the book. A lengthy bibliography is added, but there is no index, which, in a volume of this character, would be of great value. The table of contents hardly gives sufficient reference for a busy practitioner to find any special subject. Some forty original diagrams elucidate the anatomophysiologic descriptions. H. V. W.

College of Physicians of Philadelphia, Transactions. Third Series, Volume 41, 1919. Pages 416. Published by the College. H. R. M. Landis, Editor.

The Transactions of the Section on Ophthalmology of the College, as published in this JOURNAL, make up 36 pages of the present volume. In addition there are 5 papers read before the College itself which deal with matters of ophthalmic interest. These take up "Concussion and Contusion Injuries of the Eye in Warfare;" "Reeducation of the Blind Soldiers;" "Research Work on Problems of Aviation;" "The Army School of Ophthalmology;" and Plastic Operations on the Nose and Eyelids." E. J.

A Physician's Anthology of English and American Poetry. Selected and arranged by Casey A. Wood, M.D., and Fielding H. Garrison, M.D., 12 mo. 370 pages, Oxford University Press. London, New York and other cities.

This collection of short poems is dedicated to the memory of Sir William Osler, and was intended as a tribute for his seventieth birthday. The collection had passed thru his hands and met his approval; and was in the hands of the publishers when his death came, December 29, 1919. The "Foreword" of 15 pages, written by F. H. G., is largely an appreciation of the personality of Osler; but to some extent it is an interpretation of the mind of the physician, the attitude of thought that develops from his studies and his life. This collection suits the physician's psychology as well as any that has been made.

The verses have been gathered from wide sources, from Shakespeare and Ben Jonson to Rupert Brooke and Yeats. The writers most largely rep-

resented are Mathew Arnold, Emily Brontë, Robert Browning, Clough, Emerson, Lecky, Tennyson and Wordsworth. Physicians, including Bridges, Keats, Holmes and Weir Mitchell, have furnished some of the best work; and some of them, as Henry Head and W. S. Thayer, appear here in a role in which we had not before known them. The more than 300 poems, and excerpts from poems, here collected show wide reading and catholic taste on the part of the collectors. Many of the favorites of the older collections are here, but many are not to be found in any earlier anthology.

It is most inspiring to learn what such busy men have done in their leisure moments. It is pleasant to think of the Editor of the American Encyclopedia of Ophthalmology and the Editor of the Index Medicus, amid the rush and strenuous effort of war conditions finding relaxation in the discussion of the relative merits of candidates for place in this tribute to the earnest, kindly, sympathetic leader of the medical profession. The result of their conferences is worth having. It is a book that the busy physician can carry in his pocket, or pick up for a moment, long enough to read a verse that may stay with him half a day, a refuge from the complaints and fault findings amid which he has to work.

E. J.

CORRESPONDENCE.

Cataract Operations.

To the Editor: I was glad to see Dr. Ellett's letter in the March number of the JOURNAL, in which he commented on Dr. Vail's cataract article in the August, 1920, number of the Ohio State Medical Journal.

Time only strengthens my belief in the inadvisability of performing the Smith operation in this country. Social conditions in India have made it almost necessary to reduce a cataract operation to the briefest time possible; hence the evolution of the intracapsular operation. Enormous material has enabled Indian operators to acquire great skill, but lack of late statistics

has rather clouded judicial conclusions. Several conditions and necessities have rendered the intracapsular procedure the operation of election in India, but these environments are nonexistent here.

Here we may deliberate and conclude as to the really safest procedure, the one yielding the best percentage of good results, the one we would choose for *ourselves*. Because circumstances have dictated the wisest operation for India is no reason why this procedure should be forced upon America, where conditions are entirely different. Neither should we be unduly influenced by returning travelers like Green, Vail, Fisher, and others who, having been tutored and enthused in India by Smith and privileged to perform hundreds of operations under his skillful tutelage, desire to transplant the Smith operation into America.

Doubtless they possess considerable skill in their new operating venture, and they are certainly most enthusiastic and perhaps view with some impatience the unconvinced home ophthalmologists. But they must not be disquieted if their professional brethren fail to respond to their enthusiasm and eloquence, and they should remember that very few of us have had the advantage of an Indian journey and hundreds of personally conducted experiences into the mysteries of the intracapsular operation. We are but humble operators, doing perhaps 50 or 60 senile cataract operations a year and feeling a great sense of responsibility over each operation as it comes, a sincere desire to get the best possible result in each and every case, and unable to find an instance where experimentation seems justifiable.

Besides this, our patients stay with us; we see them or their friends from time to time; they are within reach of influences that may injure our reputation; they have access to law courts; they do not come and then go back into the distant hills of India to be heard of no more, blind or otherwise. Associated sentiments and interests, therefore, inspire us to tread the path of conservatism, to continue procedures that have

proven quite satisfactory, and to accumulate knowledge and perfect our technic as time passes and opportunities present themselves.

I do not condemn the Smith operation when performed in India, where it is almost a necessity—I do not even (*perhaps*) condemn it in America when performed by those who have received special instruction on many cases, but I *do* emphatically protest against it when attempted by *myself*, an average operator with no especial instructions and limited opportunities. Successful results following the Indian operation are brilliant and seductive and may easily and naturally lure the young and enthusiastic operator from the admonishments of conservatives. But I doubt if the general adoption of this extrahazardous procedure would yield as good average percentages as the older operations and I will further venture the belief that this would be true, *even*, with *experienced* American ophthalmologists. I believe that some day a conservative intracapsular operation will be proposed and adopted, but I am quite positive that the Smith Indian procedure will never be extensively used in this country. One feature of this operation I cordially endorse and use, viz., the retractors instead of the speculum; for, altho rather awkward to use, they certainly diminish the chance of escaping vitreous by *lifting the lids away from the eyeball*.

I have been greatly interested in the six points emphasized by Dr. Ellett as conducive to good results because, I suppose, they harmonize so fully with my own observations. They are as follows:

1. "Complete anesthesia." This is *most* important and after the incision is made, especially if an iridectomy is contemplated, I let a little of the anesthetic fluid pass into the anterior chamber and then remove the retractors and wait a short time for iridic anesthesia, as it very much lessens the tendency to ocular sensitiveness and motion, when the iris is pulled out and cut, thus lessening the danger of anterior chamber hemorrhage, which is always an embarrassing complication. I also cocaine both eyes for it serves to increase the quietness of the patient.

2. "Quiet in the operating room."

This dictum from a man of Dr. Ellett's excellent and tranquil personality is a great comfort to me. I acknowledge to the possession of a nervous disposition and I have always attributed to this personal defect my aversion to noise in the operating room during the performance of a cataract operation, which necessitates the condensation of much intense and concentrated mental anxiety and tenseness within the space of a very few moments. Hereafter I shall offer no apologies when I verbally and profanely object to the dropping of tin pans on the stone floor, the slamming of doors, the hum of conversation between internes and nurses or the loquaciousness of the patient.

3. "The patient should be told how to relax, etc." Many operations are spoiled by ignoring this suggestion. The patient should for the time being give himself over, body and soul, to the operation and yet many fight and resist and exhibit cowardice and thereby spell ocular ruin and destruction. A few reassuring and instructive words from the surgeon before and during the operation sometimes means ocular salvation; but the patient himself should relax, obey orders, and maintain absolute bodily and lingual quiet. Sometimes training the patient in looking up, down, in, and out for a few moments helps a good deal, and he should be told to keep his other eye open during the operation and to use it for fixation purposes.

4. "A large corneal incision is essential." Vitreous loss often follows a disregard of this rule. Nothing is more foolish than to endeavor to extract a large lens through a small incision; it simply invites disaster. This is also true of many traumatic cataracts, which are not always semiliquid by any manner of means. For this reason I prefer a Graefe knife and a capacious incision to a keratome and a small incision in many cases of traumatic cataract.

5. "A free capsulotomy." This is so evidently essential that it manifestly requires no argument and yet I have seen poor results follow a disregard of this rule.

6. "A careful toilet of the wound." This is essential. Every particle of lens

matter compatible with safety should be coaxed out of the eye. Many pupils look quite black after lens delivery, but show large amounts of opaque lens substance at the first dressing, on account of the nonremoval of lens fragments at the operation. Careful expression with spoons will remove much substance and this is much safer with the retractors than with the speculum. This procedure can be supplemented by washing out the anterior chamber with an irrigator. For this I prefer my own instrument, consisting of a gold end, shaped like a strabismus hook, with about a foot of rubber tubing attached to an air bag. This apparatus can be operated at the side, which is much better than using a pipette in the upper area of the eye under the brow. By thus operating, lenses, even tho not thoroly hard, can be effectually removed. The iris coloboma should be carefully stroked into place by manipulations on the surface of the cornea.

As a safety procedure I earnestly advocate a preliminary iridectomy, as it divides the attack on the eye and allows the cataract to be removed at the second operation, practically without anterior hemorrhage. I should certainly insist upon this precaution in my own personal case, if I had a cataract.

By observing these (and other) precautions, cataracts that are not thoroly ripe can, I believe, be removed with as much (and perhaps more) safety than with the Smith Indian operation; and it should never be forgotten that many ripe and mature cataracts never develop thoro peripheral opacity. In many cases, the fundus can still be seen quite well and if we waited until complete opacification occurred we would never operate at all.

FRANK ALLPORT.

Chicago, Ill.

TRAINING THE HANDS.

To the Editor: Dr. Rush's little article on "Training of the Hands" in the January number attracted my attention because of the importance of the subject and because of the uninteresting exercises he chooses to gain the desired object.

As he says, there must be mental and physical steadiness. The latter is the result of confidence in one's own knowledge of what he is doing.

Physical steadiness is the result of muscular strength and fine coordination of this strength. There are two amusements that gain all these ends in a most pleasant way, namely the game of tennis and target shooting with the 22-caliber target pistol. I have found nothing harder than to so coordinate all the muscles of the body, those of the outstretched arm, the trigger pull, with the eye holding the sight on a one inch bullseye at 20 yards. When one has learned this so that he can average 88 or 90 out of a possible 100 he need have no fear for his muscular steadiness.

I have also to disagree with him on the subject of size of hands. Mine, I fear, are unduly large but no one has ever accused me of unsteadiness; in fact, just the opposite. One of my confreres here when watching me do a cataract once said he wondered where I concealed the muscle necessary to hold *such* a hand so steady.

Physical weakness and coordination cannot exist together.

Very respectfully,

RODERIC O'CONNOR.

Oakland, California.

ABSTRACTS

Gallemaerts, E., and Kleefeld, G.
Microscopic Study of the Living Eye.
Annales d'Ocul. v. 157, 1920, p. 257.

This is the last of a series of papers published in earlier numbers (v. 156, p. 641; v. 157, p. 89, 129). The lens is first discussed. Special care is necessary in the focusing and in the adjustments.

Normal Léns. In an ectopic lens, the surface seems to be covered with small, brilliant prominences and excavations. In the latter are small, very delicate fibrils, arranged more or less concentrically. The mottled appearance is more pronounced at the center, less so towards the margins. The latter is perfectly smooth, and describes a perfect circle. Frequently the lens is covered with remnants of the pupillary membrane, which sometimes seems to be united to the capsule in a white point, which does not penetrate into the substance of the lens. At other times there is a thick fibrillary layer of grayish color covering the central part of the lens, often covered with small points which project into the anterior chamber.

When the lens is dislocated laterally, the insertion of the zonula is seen in the form of rigid filaments, like splinters of quartz.

The lenticular star is arranged as follows: The median branch is vertical and the other two are inserted at its inferior extremity, forming three angles. It is visible at every age. In each branch is seen a canal, optically empty and black, between two grayish tracts. There are neither nucleus nor fibers seen.

The posterior star is more complicated. It has three to four branches, often inserted at the same points. Sometimes there is a small horizontal line, at whose extremities the branches arise. Their tracts are sometimes rectilinear, sometimes sinuous. After running about 1 mm. they usually divide into two diverging branches. They are like the anterior branches, except that after dividing, there is only one grayish tract. The posterior capsule is dif-

ficult to examine but seems mottled like the anterior. Anomalies are frequent, on account of the fetal circulation.

Opacities are found very frequently in the normal lens, in the form of regularly distributed bluish gray points, but this varies. It is very difficult to differentiate these normal from pathologic opacities, unless they have been watched for a long time.

In the senile lens there is a considerable opalescence, the stars are much more distinct, and the fibers are less transparent. The nuclear part of the lens is distinctly more opaque than the periphery. In different places are areas of different refraction from the surrounding part, resembling bubbles of gas. The reflex from the anterior capsule is duller, and often there are raised areas, bullae filled with Morgagni's fluid.

Blue cataract is a misnomer. The spots are bluish, yellowish or grayish, sometimes club shaped, sometimes biscuit shaped, and they lie rather in the cortex than in the nucleus. Large numbers of microscopic crystals are found, with a greenish or reddish reflex.

Cataract. It is necessary, from a microscopic standpoint to differentiate congenital, senile, traumatic and complicated cataracts. The varieties of congenital cataract observed are zonular and polar, the latter being anterior and posterior fusiform, and in plaques. The zonular is seen as described by various authors, with the difference that almost the entire lens shows the opacities, which are rarer in the clear zones.

The question of the congenital or inflammatory origin of the anterior polar cataract is made more obscure. In all cases observed there were present brownish filaments which often extended towards the iris trabeculae. Sometimes these were very long and free in the anterior chamber, covered with debris of pigment cells, resembling remnants of pupillary membrane. The cataract itself is pyramidal in shape, with a slightly curved axis, and is so dense that no details can be made

out. The capsule shows a grayish, circumscribed elevation, much larger than the cataract, which is in relation to the filaments previously noted. Beneath this is a series of lamellar, very opaque areas of variable sizes, superimposed and joined by opacities which are suggested rather than seen.

The congenital and inflammatory posterior polar cataracts are almost identical in appearance. The congenital is a conical mass, extremely dense at its base and well outlined, while the inflammatory is almost star shaped and is less condensed. The plaque form lies in the middle of the lens. It frequently has a star shape, but usually has the form of a rosette, with the more opaque part at the periphery. It is composed of small white, almost mother-of-pearl points. Instead of a plaque, these may form a very delicate spherule.

The appearance of the lens in senile cataract corresponds to the classic description. The important thing is the condition of the anterior capsule, upon which depends the success of the operation. When the cataract is mature, the normal capsular reflex and the mottled appearance have disappeared. A very diffuse fibrillation appears, accompanied by small elevations formed by Morgagnian fluid. The lenticular opacification has a radial aspect, composed of small white points which form grayish or yellowish gray areas. The so-called Morgagnian cataracts show a sclerosed capsule, behind which is a grayish white, diffuse coloration.

Complicated cataracts vary with the calcareous content. Both capsule and cortex are usually intact. The lens substance is traversed irregularly by grayish, shining, translucent areas, resembling large crystals of alum, between which are spaces of a black appearance. This fibrillary arrangement would indicate a toxic, while that of the senile would indicate some other origin.

In traumatic cataract the ruptured capsule hangs in the anterior chamber, is transparent, rolled up and nonelastic. The contained lens is diffusely opaque, while frequently there are

found in the anterior chamber masses of shining transparent lens fibers. The usual appearance is that of a cobweb, with relatively thick, very brilliant radiations, united by many layers of delicate, brilliant tissue, sprinkled with cholesterol crystals. Frequently, posterior synechiae are found. It may show a hernia of the vitreous into the anterior chamber.

The vitreous. Only the anterior third can be examined, and that is difficult. After suitable preparation, a bluish haze can be seen behind the lens, which is the vitreous. This has a wavelike movement when the eye moves. Then a whitish, sinuous filament can be seen. The postlenticular space has the thickness of the cornea. The anterior limiting zone is traversed anteroposteriorly by fibers of varying numbers, and this zone does not move. The vitreous proper is composed of a framework, bathed in fluid, of a network of fibers of variable thickness and shape.

The opacities caused by the inflammation in the region of the choroid are rarely visible by the microscope. The vitreous may, however, show alterations consisting of deposits: (a) red or white globules, (b) pigment cells, (c) crystals of hematoidin or cholesterol, (d) fibrin. The elements of the vitreous itself may be altered in the direction of rarefaction or of increase.

In synchysis scintillans there are present small ovoid yellowish white, or iris colored bodies, especially numerous in the periphery, and with limited movement. However, when the eye is moved, they are set in motion and give the scintillating effect.

In hernia of the vitreous there is a network of whitish filaments, of varying thicknesses, with a yellowish spot at the intersections. These hernias partake of every ocular movement.

C. L.

Weisfelt, W. A., Influence of the Heterophoria on the Amplitude of Accommodation. Doctorate thesis. Utrecht, 1919.

Weisfelt has investigated the influence of the position of rest of the vis-

ual lines on the amplitude of accommodation. One can imagine that the extra strong convergence with exophoria and the lessened convergence with esophoria can have an inciting or retarding influence on the innervation of the ciliary muscle, which is one of the two factors that regulate the amplitude of the accommodation. It was necessary to investigate once more this amplitude, especially for younger subjects. The vision must be 5/5 with or without correction.

The determination of the refraction gives us the punctum remotum. The simplest way for determining the punctum proximum is to bring an object slowly towards the eyes and to measure the smallest distance at which it can be still seen clearly. Weisfelt has used a dull dead black cover of a cylindrical tube of the size of a silver dollar, which has a rectangular opening 3 cm. long, 1 cm. broad, in which could be placed strips of paper on which were printed small letters of Snellen ($D. = 0.5$) or numbers. During reading the tube is brought towards the eyes until the patient begins to hesitate, which indicates that the near point is reached or approached. This important indication is absent with Duane's object. With a tape the distance from the cornea is measured. The determinations must be repeated until values are found which do not differ more than one-half centimeter. Numbers are preferred, as they miss suggestive readings. The experiments were done during the summer months in the middle of the day. Practical reasons allowed only determination of the total hyperopia in a limited number of cases. The heterophoria was determined with the Maddox rod before the right eye and measured with prisms. The younger individuals were normal as to ocular conditions.

No appreciable difference in amplitude of accommodation was found between the right and left eyes. Exceptionally the difference was 0.5 D. The highest and lowest values compared give not a larger difference than 3 D. The average amplitude of accommodation after the 15th year differs only

slightly from that of Clarke. Graphical demonstration shows that beneath the 20th year, Weisfelt line runs between that of Donders and Duane, above this age it remains permanently above the one of Duane, with a meeting at the ages of 40 and 45.

Weisfelt found 8 persons with esophoria greater than 2° , esoph. 2° and 1° in 19, orthophoria in 19, exophoria 1° and 2° in 18, and exophoria greater than 2° in 13. The eso- and exophoria did not seem to have any influence on the monocular amplitude of accommodation. In many cases of exophoria larger than two prism degrees the binocular amplitude was larger than the monocular, probably under influence of the strong convergence on the innervation of the ciliary muscle. In the lower cases of exophoria and with esophoria no difference could be detected between the amplitude for both eyes taken together and for each eye separately. Heterophoria, as such, does not necessarily give rise to complaints of headache or asthenopia. It is the expression of a balancing around an average.

Graphs and a complete list of all the examined cases accompany the thesis.

E. E. B.

Junius. Vernal Conjunctivitis. *Archiv für Augenheilkunde.* LXXXVII. Bd. Heft 1-2. (1920.)

The clinical picture of so-called spring catarrh of the eye is well known, but its cause has as yet not been ascertained. Junius has conducted experiments and brought together the literature, seemingly showing that certain changes in the blood, more particularly in the production of porphyrin, together with the photochemical effects of light, cause vernal conjunctivitis.

The characteristics and course of the disease are peculiar. Its causes can only be in two possibilities; either the irritation of the light or its effect, causing a change in the metabolism of the tissue, or a parasitic influence, the latter of which has never been shown. The effect of light rays cannot be its sole cause, although clinical observa-

tions show this to be of considerable influence. Clinical observations and pathologic anatomy show the following:

1. The disease is not a catarrh in the ordinary sense, as it is not usually accompanied by free secretion of eosinophile leucocytes, even when there is a little tenacious secretion. There is a whitish color of the membrane, as if plaster had been strewn over it. The tubercles or granulations exist on the tarsal surface of the lids and also on the circumcorneal ring, but the portion of the conjunctiva exposed by the aperture of the lids is not affected and the cornea always remains clear.

2. The disease is always bilateral. The circumcorneal ring is affected, but corneal ulceration only occurs by reason of trauma. The process is the same in the lids as it is at the edges of the cornea.

3. The disease occurs chiefly in children and young people, usually under 20 years of age without other general complications or diseases, and it begins in the spring.

4. The symptoms increase in summer and ameliorate in the fall. Many patients are well all winter, but have the disease intensely the next spring, and it goes on for years. Cicatrices never form.

5. Treatment does not cure. Operations are of little effect—the disease recurs. Symptomatic treatment brings some relief. Protection glasses and collyria are of benefit. The lid commissure is not affected, so we must look further for the cause than the results of light. The parasitic cause is not to be lost track of, as the histologic picture is like that of rhinoscleroma with hyalin sclerosis, and in other trophic diseases there is a more or less well defined parasitic etiology.

The following unanswered questions have not yet been solved:

1. Why is the disease limited to young persons who have not yet reached full development, who are usually better protected from the effects of sunlight than many of older years?

2. Why does the disease disappear in other surroundings and even in the

same environment, spontaneously, without cicatrices, before the beginning of old age?

3. How can we reconcile the observations that the patient has a pasty look and enlarged glands about the head, which do not often occur in the neck, as they do in scrofula and tuberculosis, but are found in other parts of the head?

4. Why is it that eosinophilia is found in the tissues and seldom seen in the blood of the general circulation?

- v. Tappeiner and Raab seems to show that chlorophyll eosin and other fluorescent chemical substances have some influence in sensitizing. Meyer-Betz shows that increased hematoporphyrin kills paramecia in the light and takes the coloring out of the red blood corpuscles. Injection experiments in warm blood animals of this substance show that when they are kept in the dark they remain alive and healthy, but when brought into the sun these animals have photophobia and become diseased and die. The experiments of Meyer-Betz also show that increase of hematoporphyrin causes an increase in the sensibility of the skin.

Does this or another derivative of the blood give rise to an etiologic factor in the production of conjunctivitis vernalis? A number of case histories and experiments are cited, showing that pathologic increase of hematoporphyrin in the body has an influence in causing severe disease or irritability of the skin, in a sense of the photodynamic effect of light, especially in hydroa vacciniform and like conditions; also in hematoporphyrin acute, toxic and chronic.

Hematoporphyrin is produced from the hematin of the blood, which is an acid connecting with hemochromogen, the second component of the coloring matter of the blood, hemoglobin. In the destruction of chlorophyll, the coloring matter of plants, phyllerin and porphyrin are produced thru oxidation, and a similar destruction in the blood produces hematin and its derivatives. Hematoporphyrin exists in impoverished blood and causes changes in the skin and conjunctivitis. There is a pre-

dilation in the overlying capillaries of the circumcorneal area and in the tarsal conjunctiva, over the cartilages, for changes due to hematoporphyrin.

Injection experiments of the chemical constituents of the coloring matter of the blood show the following: Hematoporphyrin has a strong effect in causing intense sensitization of the tissues to the effect of light. Mesoporphyrin, which is in close relation with hematoporphyrin, has little effect. Porphyrinogen causes intensive sensitization. The hitherto unknown constituent, porphyrin, causes intense sensitization and it is thought that porphyrin, with the photodynamic effect of light, plays a role in the production of vernal conjunctivitis.

H. V. W.

Fuchs, E. Proliferation of the Ciliary Epithelium on the Lens. *Klin. M. f. Augenh.*, v. 64, January, 1920, p. 1, illustrated.

Fuchs gives the anatomic description of a congenitally myopic eye of a boy, aged 11, with other congenital anomalies, viz., ectopia of the lens, abnormal shape of the ciliary processes and remnants of the hyaloid artery. It had sustained 2 injuries within 3 months; a small perforation of the cornea without infection, and a contusion causing dislocation of the lens, hemorrhages of the vitreous and subretinal space, rupture and detachment of the retina, with subsequent hypertension, degeneration of the retina, and proliferation of the ciliary epithelium.

This proliferation started from the tear of the pars ciliaris and spread forward over the whole iris and a portion of the posterior surface of the cornea, and backwards on the largest part of the lens. Here it was intensely pigmented, imparting to the lens a black aspect from in front, similar to the "pigmented secondary cataract," described by Brückner. The proliferation of the ciliary epithelium is rather frequent in hypertension of long standing, especially in ectatic eyes. Fuchs published this case of pigment covering of the lens, as Brückner could not find a similar case in literature.

C. Z.

Lindner, K. Metastatic Ophthalmia, with Striped Corneal Opacities. *Klin. M. f., Augenh.*, March-April, 1920, p. 217.

A Russian prisoner was brought into the hospital for a gunshot fracture of the right knee with gas phlegmon and general symptoms of sepsis. After two days the thigh was amputated. A week later he could not see out of his left eye, the cornea of which had become opaque. He died after two days. His eye was enucleated four hours later. The capillaries of the marginal vascular loop of the cornea, the anterior ciliary veins and the canal of Schlemm were filled with streptococci. There were also thin tracts of streptococci between the posterior lamellae of the cornea, in the nucleus of the anterior chamber and the insertion of the ciliary muscle, in the iris and the plane part of the ciliary body, along a posterior ciliary nerve into Tenon's capsule and in the suprachoroidal space. Except a few chains at the border towards the posterior chamber, the vitreous contained no streptococci, nor did the vascular system of the uvea and retina. The cellular elements of cornea and sclera and the whole tissue of the iris were necrotic.

There was only moderate leucocytic infiltration in the episcleral tissue. This lack of defensive reaction is explained by the last stages of septicemia, in which the ocular affection occurred. The center of the cornea was thickened by swelling of the necrotic tissue. The peculiar formation of stripes in the opaque cornea is attributed to the optical effect caused by the entrance of aqueous in the cornea thru the necrotic endothelium. C. Z.

Staicovici, N. and Lobel, A. Treatment of Trachoma During the War. *Arch. d'Ophthalmologie*, Vol. XXXVII, No. 11, November, 1920, p. 689-699.

The authors' report on the treatment of 12,000 cases is interesting, not alone on account of the large number of cases considered, but also because it concerns cases of a few days standing up to cases which had been treated in the regimental hospitals twenty years

previously. The first feature worthy of note was the predominance of the gelatinous, friable granulations. The follicular form was seldom seen, due, as the authors think, to the fact that these milder forms are seen and treated early.

The authors uphold the existence of an acute form of granular conjunctivitis; and look for corroboration to Morax, who observed several cases in Egypt presenting the acute symptoms. These he interpreted as mild infections added to old-standing cases of trachoma. In such cases the swelling of the lids and conjunctiva may assume such proportions as to suggest purulent ophthalmia, but the profuse secretion of gonorrheal ophthalmia is lacking. As this condition may last for weeks, corneal and other serious complications may add themselves to the original pathology. When, however, a patient comes with the history of having suffered for a few days only, and has one eye only affected, the other being perfectly sound, as the authors saw in the person of one of their male nurses, no doubt as to the existence of a primary acute granular conjunctivitis can exist.

After passing in review the numerous surgical procedures the authors state their decided preference for curettage. But even this procedure was found wanting in many cases, in which the papillae were indurated to such a degree that the curette removed the surface only, and the patient left the operating table with his lids almost as thick as before the operation. This made them seek a means of removing the diseased conjunctiva in its entirety, and this desideratum was found in cube sugar which had been sterilized in alcohol. The rough surface of the sugar removes the conjunctiva in a uniformly regular way down to the tarsus much better than the curette. It showed the superiority also in cases in which there was a recurrence after treatment with the curette.

The manner of procedure is: after disinfection and anesthesia with cocain instilled and injected under the conjunctiva, the lid is turned over as far

as possible on a hard rubber lid plate, where it is held under tension with a double hook inserted close to the margin of the lid. Holding this hook in his hand the operator puts traction on the conjunctiva so as to draw it out of the fornix and immobilize it against the rubber plate. Holding the cube of sugar in his right hand the operator rubs lightly over the conjunctival surface from one side to the other, beginning in the fornix and ending at the lid margin. The treatment concludes with the conjunctiva in the canthi, which demand special care, as this is the most difficult place to get to. In the more rebellious cases a more energetic rubbing is called for. The operation may be considered complete when a smooth, milky-looking surface comes to view thruout. The lower lid is treated in the same way.

To conclude the eye is washed with a 1/5,000 solution of oxycyanid of mercury. Both eyes are operated at one sitting, the cocain anesthesia making it possible, inasmuch as the pain is far less than that caused by curettage. The eyes are bathed twice a day with the oxycyanid solution just mentioned, and a 3% solution of protargol instilled. About five days later the swelling of the lids has disappeared, and the false membrane has begun to detach itself from the abraded surface. The gradual cicatrisation is aided by cauterisation with 2% silver nitrat or sulphat of copper (which seems to have a specific action) practised twice a week.

A point of great importance in this procedure is the following: when the lid has been reversed and the cocain injected, so that the fornix is brought into plain view it can be seen that the pathologic process stops at a line of demarcation in the fornix, and that from this line up to the limbus, the bulbar conjunctiva is absolutely healthy. It is of greatest importance that we respect this healthy conjunctiva, for it is from this healthy conjunctiva in the fornix that the repair material comes, and is gradually drawn towards the lid margin. The more abundant this repair material the

better will the lid retain its form and suppleness.

Amongst the cases observed were some which had been operated on by other methods many years before, which showed a perfect cicatrisation of the palpebral conjunctiva with a pearl white color, in which, however, there were serious corneal complications, such as vascularised pannus and ulcers, even to the perforating kind. The authors explain this by saying that the continued friction of a hard tissue, such as the scar tissue replacing a totally destroyed conjunctiva, deprives the cornea of the protection of a supple and moist covering such as nature intended it should have in the normal conjunctiva.

To obtain the disappearance of the neoformations and to prevent the transformation of the palpebral conjunctiva into cicatricial tissue which might endanger the cornea by the close contact with an indurated tissue, as well as by the secondary deformities of the lids, the authors have resorted to massage, or rather to friction of the conjunctiva to promote the resorption of the adenoid tissue. Cocain anesthesia having been produced and the lid having been turned over on a Desmarres clamp, 50 or 60 frictions are made with the tip of the little finger, carrying an ointment of 30% sulphat of copper. The lower lids receive the same treatment, and the eye is then washed with a jet of water. A mild tumefaction of several hours' duration ensues. The friction is repeated on the third day. In the numerous cases in which this treatment was used, results were obtained in some which deserve the word "marvellous." When both eyes are affected the treatment should be given to each eye on alternate days.

Amongst the complications of trachoma none is more feared by both patient and physician than the corneal ulcers which may appear at any stage of the disease. In more than 400 cases the authors found the sovereign remedy to be the immediate injection under the conjunctiva a mixture of one-half ccm. of 10% dionin and one-half

ccm. of 1/3,000 cyanid of mercury. An intense local reaction ensues, but an hour later the patients are happy, all pain having disappeared. Both the formula for the injection and the idea of injecting at the earliest moment, instead of first trying out all kinds of drops and ointments, are new. In most cases the ulcers were aborted with three injections made at intervals of three days; in some cases one injection sufficed. At the same time a probable pannus was headed off. To be sure, in some cases of severe ulcers recourse to conjunctival autoplasty became necessary.

In chronic vascularised pannus the authors employed peritomy modified in the following manner: The conjunctiva was detached at the corneoscleral margin over half of the circumference of the cornea and dissected back with scissors and bistoury for at least three millimeters. With a lump of sugar disinfected in alcohol the uncovered area was rasped until all tissues down to the white sclera had been removed. In this manner a complete interruption of the circulation is obtained, a cicatricial band results, and the pannus recedes.

The authors reproach most of the methods for the relief of entropion and trichiasis with their inability to prevent recurrences, or the ugly deformities produced without compensating relief. The only method which meets their approval is that of Kuhnt, by which the underlying cause is removed, and the levator advanced and strengthened so that the palpebral opening is enlarged. The entropion of the lower lid is best corrected by the method of Panas, modified to this extent that the cartilage is split from one end to the other, which allows an easier turning outward of the margin. They have also corrected the entropion of the lower lid according to Boucheron by extirpating the tarsus, and according to the easy and quick method of Thilliez: vertical cauterisations of the tumefied conjunctiva followed by median blepharorrhaphy, which is maintained for a fortnight.

The lacrimal apparatus should always be inspected, and in most of the cases of some duration the canal will be found obstructed. Fukala thinks the greater resistance of negroes to trachomatous infection is due to the greater patency of the lacrimal canal.

M. W. F.

Guillery, H. Tuberculosis and Sympathetic Ophthalmia. Arch.f. Augenh., v. 86, Heft 1-2.

Guillery gives a review of the literature on the similarity of the anatomic findings in sympathetic ophthalmia and tuberculosis. He shows the discrepancies of interpretation on account of the repeatedly emphasized difficulties, the frequent failure of inoculation and the finding of bacilli. For facilitating the bacteriologic diagnosis, Guillery emphasizes the accumulation method after treating the tissues with antiformin, which yielded such good results in examination of sputum.

The eyeballs were fixed in formalin or sublimat, and after washing and treatment with iodine in alcohol, hardened in alcohol up to 96%. Then the eyeball was sagittally cut in half. The uvea of one-half was cut in smaller pieces, placed in 15% antiformin solution, and put into an incubator. After about 5 hours everything was dissolved: The centrifugate was transferred to a slide, fixed over a flame and stained according to Ziehl-Neelsen, or partly according to Much. The other half was used for histologic examination. Thus Guillery examined various tubercular organs of man and animals, and found in almost all cases without difficulty the bacilli, but not always in great number.

The histologic examination of an eye enucleated on account of chronic iridocyclitis, phthisis, with nodules in both irides, showed in several hundred sections no typical tubercular foci; but the antiformin method rendered the bacteriologic diagnosis probable. In the eye of a child who had died from general miliary tuberculosis, the choroid presented anatomically nodules of typically tubercular structure, many

giant cells and partial tyrosis, but no tubercle bacilli. The centrifugate showed all over on the slide easily detectable bacilli.

In order to prove the method further Guillery inoculated rabbits thru the intravenous injection of tubercle bacilli. Anatomically, infiltration of the iris with lymphocytes, diffuse and in small foci, was ascertained; and in the choroid small foci of round and epithelioid cells, no giant cells. The other half of the eye treated with antiformin regularly exhibited bacilli. Guillery recommends his method in uveitis of unknown origin. The eyes must not be treated with Mueller's fluid, which inhibits the staining of tubercle bacilli. The result probably will be that the border lines of ocular tuberculosis must be further advanced. C. Z.

Szily, A.v., Senior. The Blind Spot as a Means of Exposing Simulation of Unilateral Blindness. Klin. M. f. Augenh. v.65, p.1.

Three equidistant horizontal round marks the size of a dollar are placed on a vertical wall. If one fixes at a proper distance the central mark, the image of the right mark falls upon the right optic disc and that of the left upon the left optic disc. However, all three marks are seen simultaneously, because the images of the two lateral marks are thrown laterally on the macula in the contralateral eyes.

The person to be examined is placed opposite the central mark, with a sufficiently large screen held between his eyes in the median plane and is ordered to fix the central mark. If his distance from the wall is not so that the retinal images of the lateral mark do not fall upon the blind spots he sees, (if he is not blind in one eye) the right mark with the right eye, the left mark with the left eye. If he is blind in one eye he does not see the mark of the corresponding side. The malingerer asserts the same.

He is now asked to approach the wall until he sees only the central fixated mark (which occurs if the images of the lateral mark impinge on the optic disc of each eye), and to remove

the median screen. If he sees in both eyes he will at once see also the lateral mark. If he is blind in one eye he sees only two marks, besides the central a lateral one; but not as before the one on the side of the seeing, but on the side of the blind eye; because the image of the homolateral mark falls upon the blind spot, and only the image of the contralateral mark upon a seeing place of the retina. The malingerer whose attention is by no sensation directed to the behavior of the three marks visible to him, without exception insists on his former assertion; and denies as before that he sees the mark on the side of the blind eye. However, he must be prevented from closing one eye, by which he might gain correct orientation. C. Z.

Elewaut. Hemianopsia from Occipital Wound. Archives Medicales Belges, September, 1920.

The author reports three cases of homonymous lateral hemianopsia following gunshot wounds of war. In the first case a fragment of shell struck in the right occipital region. There was prolonged coma, typical lateral homonymous hemianopsia, and conservation of the macular vision. The visual acuity was very poor, considering that the eye was emmetropic and presented no lesion. But this diminution of visual acuity was due to meningitis, having affected the cells of the occipital visual center.

In the second case typical lateral homonymous hemianopsia, loss of the left field, had followed a wound of the right occipital region by a rifle bullet.

The third case was one of right inferior quadrant anopsia which followed injury by a fragment of shell striking the left parieto-occipital region. DANIS.

Uhthoff, C. A.: Four Cases of Subretinal Cysticercus in Soldiers. Klin. M.f. Augenh., v.64, February-March, 1920, p. 120.

In consequence of irregular or suspended meat inspection during the

war, observations of cases of cysticercus became more frequent. In the first case of Uhthoff vision arose after extraction, from counting fingers at 30 cm. to 1.50 m. In the second case perception of light was preserved. The third case was complicated by an adherent thick capsule within a subretinal hemorrhage. Repeated introductions of the loop finally brought out the cysticercus with considerable loss of vitreous.

Incapsulations of long standing have been observed in enucleated eyes, but are rare at such early stages. The attempted treatment with iodid of potassium, neosalvarsan, and benzol was of no avail, in accordance with the experience of A. von Graefe. The visual disturbance, especially at the macula, is supposed to set in, at the earliest, two months after immigration. This question was important for granting war indemnity in this case. In the fourth case the cysticercus was near the nasal border of the disc. As the eye was without irritation and V=6/12, the operation was postponed.

C. Z.

Angelucci, A. Style in Painting. Archivio di Ottalmologia, XXVII, March-April, 1920, p.1.

Here the scientist, in a moment of relaxation, is evidently pursuing a favorite subject. He traces the development of style in modern painting from the early Christian drawings in the catacombs thru the Renaissance, to the realists, impressionists, synthesists, cubists, and ultramodern futurists.

What will interest ophthalmologists most is his account of Leonardo da Vinci's conceptions, phenomenally acute for his time, of many visual laws. He knew and wrote about the effects of binocular vision, the rules of perspective, complimentary colors, and the law of simultaneous contrast. The author shows the immense effect of this knowledge on his work and that of his successors. A bibliography of seven titles is included. S. R. G.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph C. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo. Volunteers are needed in other localities.

DEATHS.

Dr. J. Rohmer, Professor of Ophthalmology at the University of Nancy, died recently.

PERSONALS.

Dr. Hansell, of Philadelphia, will leave for Europe in June to remain abroad for three months.

Dr. Walter K. Seelye, of Seattle, announces that Dr. S. D. Maiden is now associated with him in practice.

Dr. Hiram J. Smith has resigned as Superintendent of the Illinois Charitable Eye and Ear Infirmary.

Dr. Alexander S. Rochester, of Los Angeles, formerly of Chicago, was married on March first, to Miss Olive Margaret Redford, of San Francisco.

Dr. J. Gonin has been appointed Professor of Clinical Ophthalmology in the University of Lausanne, succeeding the late Professor Eperon.

Dr. George F. Keiper, of LaFayette, Ind., suffered considerable loss when his car was burned in a fire in the garage in which it was stored.

At the annual meeting of the Lincoln Paper Mills, Merrittton, Dr. Thomas A. Woodruff, formerly of Chicago, was elected Vice-President and Manager of the company.

Governor Morrison, of North Carolina, has appointed Dr. Wiley A. Rogers, of Macon County, to serve for six years on the governing board of the State School for the Blind at Raleigh.

Dr. David A. Strickler, of Denver, was elected Vice-President of the Federation of State Medical Boards of the United States at its annual meeting held in Chicago, March eighth.

The March tenth meeting of the Buffalo Ophthalmological Club was addressed by Dr. H. Gradle, of Chicago. The subject chosen by Dr. Gradle was "Recent Advances in Ocular Therapeutics."

Dr. Bryed Wilson of Chicago is to sever his business connection with Dr. Frank Allport, with whom he has been associated for the past three years, and on May first will open an office in the Peoples Trust and Savings Bank Building, Chicago.

Dr. Burton Chance, of Philadelphia, was the guest of the Section on Ophthalmology of the Medical Society of the District of Columbia, in Washington, on Friday, February fourth, when he delivered an address on "Some English Worthies of Science of Interest to Ophthalmologists."

Dr. Robert Scott Lamb, of Washington, D. C., will read a paper by invitation before the Ophthalmic Section of the College of Physicians of Philadelphia on Thursday evening, April the seventeenth, on "Operative Treatment of the Detachment of the Retina."

Dr. Nelson M. Black, from Milwaukee, addressed the Medical Section of the Academy of Medicine at Buffalo, New York, on March ninth. The title of his paper was "Ocular Findings in Head Injuries, Especially in Regard to the War." A complimentary dinner was given in Dr. Black's honor.

Dr. Thomas H. Fenton, of Philadelphia, who was held up and shot within a short distance of his home, in January, is recovering after a radical mastoid operation rendered necessary by the shattered condition of the bone which followed the shot. Dr. Fenton has had the sincere sympathy of his wide circle of friends, both in and out of ophthalmologic circles.

Dr. Harold Gifford, of Omaha, has been doing work in comparative ophthalmology with Dr. Casey Wood at the Tropical Research Station, British Guiana. Dr. Gifford is a well informed zoologist, and has found plenty to occupy himself, in company with the Director, William Beebe, with the flora and fauna of the South American jungle. He intends to visit the celebrated Kaitour Falls, more wonderful than Niagara, some one hundred and fifty miles in the interior of British Guiana.

SOCIETIES.

The next Annual Congress of the Ophthalmological Society of the United Kingdom will be held on the fifth, sixth, and seventh of May next, at the Royal Society of Medicine, London.

The Oxford Congress will convene at Keble College, July 6, 7, and 8. Dr. V. Morax, of Paris, will deliver on the 7th, a lecture on the "Causes of Infection after Cataract Extraction," and on July 8th Dr. E. E. Maddox will deliver the Doyme Lecture on "Heterophoria."

At the regular meeting of the Chicago Ophthalmological Society, March 21, 1921, papers were read by Dr. H. S. Gradle on "The Blind Spot," and by Dr. R. H. Good on "A Simplified Intranasal Operation for Stricture of the Nasal Lacrimal Duct."

The members of the General Committee of the International Congress of Ophthalmology, representing the American Ophthalmological Society, the Ophthalmic Section of the American Medical Association and the American Academy of Ophthalmology and Oto-Laryngology, met in Philadelphia at the office of Dr. George E. de Schweinitz, on Tuesday, February twenty-second.

The Ophthalmic Section of the College of Physicians of Philadelphia at its meeting in January reelected Dr. G. Oram Ring, Chairman; and elected Dr. Charles R. Heed, Secretary, to succeed Dr. J. Milton Griscom, the latter having served the Section as Secretary for four years.

The President of the College of Physicians, of Philadelphia, Dr. William J. Taylor, appointed the following executive committee to serve the Ophthalmic Section for the year 1921: Drs. Howard Forde Hansell, William T. Shoemaker, and George E. de Schweinitz.

At the seventy-fifth annual meeting of the Ohio State Medical Association to be held at Columbus, May third to fifth, Lieut.-Col. Henry Smith, India, will deliver a special address before the eye, ear, nose and throat section on "Ophthalmology," and he will also hold an eye clinic at one of the hospitals on the second day of the meeting.

Louisville has an eye and ear society that has been in existence for the past six or seven years, and now that things are becoming normal again is in a flourishing condition. The annual meeting was held in January and the guest of honor was Dr. J. A. Stucky, President-elect of the State Medical Association. A state eye and ear society is to be organized, to hold a meeting once a year on the day previous to the opening session of the Kentucky State Medical Association.

The International Congress of Ophthalmology, to be held under the auspices of the American Ophthalmological Society, the American Academy of Ophthalmology and Oto-Laryngology and Fellows of the Section on Ophthalmology of the American Medical Association, is a congress independent of and in no way affiliated with the International Congress of Ophthalmology which has convened from time to time in the past, the last session of which was to have taken place in St. Petersburg in 1914. The dates for the present International Congress to be held at Washington, D. C., have been changed from April 18-21, 1922, as previously announced, to April 25-28, 1922.

At the meeting of the Sioux City Valley Eye and Ear Academy at its sixteenth semi-annual session, January 19, 1921, at Sioux City, Iowa, papers bearing on the eye were read by Dr. S. R. Gifford, Omaha, on the "Meibomian Gland as a Factor in Chronic

Blepharo-conjunctivitis; T. R. Gittens, "Congenital Glaucoma"; J. M. Banister, Omaha, "Squint, Concomitant and Paralytic, Surgical Treatment"; W. P. Wherry, "Possibilities of the Intensive Post-graduate Course as Established by the American Academy of Ophthalmology and Oto-Laryngology; W. L. Benedict, Rochester, Minn., "Retinal Changes of the Kidneys and Cardio-vascular System"; and H. S. Gradle on the "Use of Some Recent Ophthalmic Therapeutic Preparations."

At the meeting of the Section on Ophthalmology of the College of Physicians of Philadelphia, March 17, 1921, papers were read by Dr. J. Parsons Schaeffer on the "Modern Conception of the Anatomy of the Naso-Lacrimal Passageways in Man," with lantern and specimen exhibition. The discussion was opened by Dr. Sydney Yankauer, New York, followed by Drs. Wm. Zentmayer and Thomas B. Holloway, of Philadelphia. Dr. William Zentmayer read a paper on "Maxwell Operation on both Superior and Inferior Cul-de-Sacs"; Dr. J. H. Dewey, on "A Device for Spectacles for Infants"; Dr. Hunter W. Scarlett, on "A Suspected Foreign Body in the Posterior Chamber, seen thru a Slit in the Iris, but not Shown by X-ray and a Cilium Lodged in the Pupillary Space"; and by Dr. Burton Chance, on "Bilateral Congenital Ptosis with Inability to Look Up."

The Ophthalmological Society of Vienna announces an extraordinary meeting to be held August 4-6, 1921. Professor Meller announces that Thursday, August 4th, at 9 a. m., there will be a scientific meeting for the discussion on "The Success of the Latest Operations for Glaucoma Compared with the Classical von Graefe Iridectomy. Drs. Uthoff and Wessely are to read the preliminary papers; the former on the clinical part and the latter on the theoretic and anatomic part. Gentlemen who wish to join in the discussion are kindly requested to inform the secretary, Dr. Lauber, in writing. At 3 p. m., there will be a demonstrative meeting. Friday, August 5th, at 9 a. m., a scientific meeting; 3 p. m., a scientific meeting; and on Saturday, August 6th, at 9 a. m., the last scientific meeting.

The place for the meetings will be announced in due time. A projecting apparatus and a sufficient number of microscopes will be at the disposal of visitors. Gentlemen are kindly requested to notify the Secretary of the extraordinary meeting, Dr. M. Lauber, Alserstrasse 25, Vienna VIII, of the papers which they intend to read or to discuss, as well as the demonstrations. This should be done before June 15th, as otherwise it will be impossible to include them in the program. The time allowed for the reading of the paper shall be fifteen minutes, for a demonstration five minutes. The contents of the papers must not have been published previously. The originals of the papers and the remarks on the discussions, including the proofs of plain sketches, have to be handed over, ready for printing, to the Secretary before the close of the meeting.

The charges for attending the meeting are 20 Marks for non-Austrian visitors, which amount should be sent before June 15th to the Rheinische Kreditbank, Filiale Heidelberg: Konto Prof. Dr. J. Meller. Reports of the meeting can be had from the publishers, who will allow 20% reduction to members attending the congress.

As it is very difficult to find lodgings, it is of the utmost importance that intending visitors should inform Dr. R. Krämer, Kochgasse 25, Vienna VIII, as early as possible of their coming, stating at the same time whether single or double bedrooms are required. Dr. Krämer will be glad to give any information about lodging.

MISCELLANEOUS.

The New York Eye and Ear Infirmary is to receive a bequest by the will of Mrs. Mary Helen Finch, New Brighton, Long Island.

It is announced that the Massachusetts Charitable Eye and Ear Infirmary will receive a donation from the estate of Joseph Thompson, of Boston.

A verdict of \$30,000 damages was returned recently in the Circuit Court of Chicago, in favor of the plaintiff, who was made blind by drinking wood alcohol.

At the last quarterly meeting of the Royal College of Surgeons of England, a committee was appointed to consider the question of establishing additional examinations in ophthalmology and in oto-rhino-laryngology, for candidates who desire to take them after having passed the examination for the Fellowship.

A school for children infected with trachoma has just been opened at Tucumán. This school is an outcome of a suggestion made at the scientific congress held in that city in 1916. It is expected that other schools of a similar character will be organized in other Argentine cities where trachoma prevails.

The eyesight conservation council, of which L. W. Wallace of New York City is president, is initiating a nation-wide campaign to acquaint the public with the importance of eye care and to urge universal examinations of school children, industrial workers and clerks in offices and stores. The organization invites the cooperation of all existing agencies concerned in any degree with the movement for better vision, particularly the ophthalmologists of the country.

The Department of Health of the City of New York, at its meeting, January 27th, adopted resolutions amending the sanitary code dealing with the reporting of communicable diseases. The new list of diseases that must be reported to the department within twenty-four hours from the time diagnosis is made includes suppurative conjunctivitis, and trachoma.

In the last issue of the Archivos del Hospital Rosales, Dr. Luis O. Arévalo of San Salvador comments on the prevalence of trachoma at El Salvador in recent years. Among 4,513 individuals examined at random in the

National Guard, penitentiaries and public schools, only one was found infected with trachoma, altho many suspicious cases were found which later proved to be follicular conjunctivitis. During the last eight years twenty-two trachoma patients have been treated at the Hospital Rosales, the number of patients having increased in the last three years. Trachoma was apparently introduced in Salvador by Syrian or Turkish immigrants. In an examination made by Drs. Arévalo, Failey and Peralta of eighty-four Syrians at San Salvador, four were found infected by trachoma and one suspected case. Dr. Arévalo has, in addition, treated eight cases, three of them in a single family. Dr. Arévalo urges enforcement of immigration laws on the exclusion of trachoma patients, the training of examining physicians in the diagnosis of this disease, the compulsory reporting of trachoma, and public lectures on this subject.

The Medical Press and Circular for February 23d publishes the following:

A German Appeal to British Ophthalmologists.

OPHTHALMOLOGISTS in this country have received a communication from a German firm in Friburg, soliciting orders for repairs to eye instruments. The opening paragraph reads, "with these lines J (*sic*) beg to inform you that J (*sic*) have just published a catalogue of 224 pages containing all instruments, appliances, furniture (*sic*), etc., which are used by the eye specialist." A quotation concerning the catalogue from "Landolt" (see A. J. O. p. 143) is added: "J thank you for sending me your beautiful and rich catalogue, the perusal of it enjoyed my professional heart." The date of this recommendation would be interesting, but it has been omitted. Further, we read: "J would be glad if you would use the enclosed postcard to ask for the sending of it [? the catalogue] free of charge." A speciality of this firm, is mentioned, that of sharpening eye instruments, "so that J can furnish you with workmanship which will give you complete satisfaction," and the hope is expressed "that you will favour me with your esteemed commands for repairs as well as for new good." This appeal sounds so loudly for itself, that any attempt at criticism would be lost in the din.

The New York Post-Graduate Medical School and Hospital announces that there will be available this year six scholarships under the terms of the Oliver-Rea Endowment.

The purpose of the Endowment is to award scholarships to practising physicians of the United States to defray in full the expenses of tuition at the New York Post-Graduate Medical School.

According to the wishes of the donor, physicians in the state of Pennsylvania will receive preference in the award of these scholarships.

Applications may be sent to the President of the New York Post-Graduate Medical School and Hospital, 20th Street and Second Avenue, New York City.